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# **Ivfunc**

***Release 0.3.8***

**LightArrowsEXE**

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## CHAPTER ONE

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### ABOUT

lvfunc, a collection of VapourSynth functions and wrappers written and/or modified by LightArrowsEXE.

If you spot any issues, please do not hesitate to send in a Pull Request or reach out to me on Discord (LightArrowsEXE#0476)!



## DEPENDENCIES

lvsfunc depends on the following third-party scripts:

- `havsfunc`
- `kagefunc`
- `vsutil`

The following VapourSynth libraries are also required for full functionality:

- `combmask`
- `d2vsource`
- `dgdecnv`
- `ffms2`
- `fmtconv`
- `KNLMeansCL`
- `L-SMASH-Works`
- `RGSF`
- `TIVTC`
- `VapourSynth-Bilateral`
- `VapourSynth-BM3D`
- `VapourSynth-descale`
- `VapourSynth-EEDI3`
- `VapourSynth-nnedi3`
- `VapourSynth-NNEDI3CL`
- `VapourSynth-ReadMpls`
- `VapourSynth-Retinex`
- `vs-ContinuityFixer`
- `zimg`
- `znedi3`

This list is non-exhaustive, as dependencies may have their own dependencies. An attempt has been made to document major dependencies on a per-function basis. Unfortunately, `*func` family modules have complex dependency graphs and documenting them is beyond the scope of this module.





## DISCLAIMER

Anything **MAY** change at any time. The public API **SHOULD NOT** be considered stable. If you use lvsfunc in any of your projects, consider hardcoding a version requirement.



## MODULES

|                           |  |
|---------------------------|--|
| <i>lvfunc.aa</i>          | Functions for various anti-aliasing functions and wrappers.  |
| <i>lvfunc.comparison</i>  | Functions intended to be used to make comparisons between different sources or to be used to analyze something from a single clip. |
| <i>lvfunc.deblock</i>     | Deblocking functions.  |
| <i>lvfunc.dehalo</i>      | Wrappers for dehaloing functions.  |
| <i>lvfunc.dehardsub</i>   | Dehardsubbing helpers.   |
| <i>lvfunc.deinterlace</i> | Functions to help with deinterlacing or deinterlaced content.  |
| <i>lvfunc.denoise</i>     | Denoising functions.   |
| <i>lvfunc.kernels</i>     | Kernels for vapoursynth internal resizers.   |
| <i>lvfunc.mask</i>        | Wrappers and masks for denoising.  |
| <i>lvfunc.misc</i>        | Miscellaneous functions and wrappers that didn't really have a place in any other submodules.                                      |
| <i>lvfunc.recon</i>       | Wrappers and functions for chroma reconstruction.  |
| <i>lvfunc.render</i>      | Clip rendering helpers.  |
| <i>lvfunc.scale</i>       | Functions for (de)scaling.   |
| <i>lvfunc.types</i>       |  |
| <i>lvfunc.util</i>        | Helper functions for the main functions in the script.   |



## FUNCTIONS

|   |  |
|---|--|
| <code>lvfunc.aa.clamp_aa(src, weak, strong[, ...])</code>     | Clamp stronger AAs to weaker AAs.  |
| <code>lvfunc.aa.eedi3([opencl])</code>                        | Generate eedi3 antialiaser.  |
| <code>lvfunc.aa.nnedi3([opencl])</code>                       | Generate nnedi3 antialiaser.   |
| <code>lvfunc.aa.nnedi3_clamp(clip[, strength, ...])</code>    | A function that clamps eedi3 to nnedi3 for the purpose of reducing eedi3 artifacts.  |
| <code>lvfunc.aa.taa(clip, aafun)</code>                       | Perform transpose AA.  |
| <code>lvfunc.aa.transpose_aa(clip[, eedi3, rep])</code>       | Function that performs anti-aliasing over a clip by using nnedi3/eedi3 and transposing multiple times.   |
| <code>lvfunc.aa.upscaled_sraa(clip[, rfactor, ...])</code>    | A function that performs a supersampled single-rate AA to deal with heavy aliasing and broken-up lineart.  |
| <code>lvfunc.comparison.compare(clip_a, clip_b[, ...])</code> | Allows for the same frames from two different clips to be compared by interleaving them into a single clip.  |
| <code>lvfunc.comparison.diff(*clips[, thr, ...])</code>       | Creates a standard <code>lvfunc.comparison.Stack</code> between frames from two clips that have differences.   |
| <code>lvfunc.comparison.diff_hardsub_mask(a, b, ...)</code>   | Diff func for <code>lvfunc.comparison.diff()</code> to use a hardsub mask.   |
| <code>lvfunc.comparison.interleave(*clips, ...)</code>        | Small convenience function for interleaving clips.   |
| <code>lvfunc.comparison.split(*clips, **named-clips)</code>   | Small convenience function for splitting clips along the x-axis and then stacking.   |
| <code>lvfunc.comparison.stack_compare(*clips[, ...])</code>   | A simple wrapper that allows you to compare two clips by stacking them.  |
| <code>lvfunc.comparison.stack_horizontal(*clips, ...)</code>  | Small convenience function for stacking clips horizontally.  |
| <code>lvfunc.comparison.stack_planes(clip, /[, ...])</code>   | Stacks the planes of a clip.   |
| <code>lvfunc.comparison.stack_vertical(*clips, ...)</code>    | Small convenience function for stacking clips vertically.  |
| <code>lvfunc.comparison.tile(*clips, **named-clips)</code>    | Small convenience function for tiling clips in a rectangular pattern.  |
| <code>lvfunc.deblock.autodb_dpir(clip[, ...])</code>          | A rewrite of <code>fvfunc.AutoDeblock</code> that uses <code>vspdir</code> instead of <code>dfptest</code> to deblock.   |
| <code>lvfunc.dehalo.bidehalo(clip[, ref, sigmaS, ...])</code> | A simple dehaloing function using bilateral and BM3D to remove bright haloing around edges.  |
| <code>lvfunc.dehalo.deemphasize(clip[, strength, ...])</code> | A function that attempts to deemphasize ringing common to SD video signals resulting from a playback device in the transfer chain poorly compensating for pre-emphasis baked into the source signal. |

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|   |  |
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| <code>lvfunc.dehardsub.bounded_dehardsub(hrdsb, ...)</code>   | Apply a list of <code>lvfunc.dehardsub.HardsubSign</code>  |
| <code>lvfunc.dehardsub.get_all_masks(hrdsb, ref, ...)</code>  | Get a clip of <code>lvfunc.dehardsub.HardsubSign</code> masks.   |
| <code>lvfunc.dehardsub.hardsub_mask(hrdsb, ref, ...)</code>   | Zastin's spatially-aware hardsub mask.   |
| <code>lvfunc.deinterlace.deblend(clip[, rep])</code>          | A simple function to fix deblending for interlaced video with an AABBA blending pattern, where A is a regular frame and B is a blended frame.                                |
| <code>lvfunc.deinterlace.decomb(clip, TFF[, ...])</code>      | A filter that performs relatively aggressive filtering to get rid of the combing on a interlaced/telecined source.   |
| <code>lvfunc.deinterlace.dir_deshimmer(clip[, ...])</code>    | Directional deshimmering function.   |
| <code>lvfunc.deinterlace.dir_unsharp(clip[, ...])</code>      | Diff'd directional unsharpening function.  |
| <code>lvfunc.deinterlace.SIVTC(clip[, pattern, ...])</code>   | A very simple fieldmatching function.  |
| <code>lvfunc.deinterlace.TIVTC_VFR(clip[, ...])</code>        | Wrapper for performing TFM and TDecimate on a clip that is supposed to be VFR, including generating a metrics/matches/timcodes txt file.                                     |
| <code>lvfunc.denoise.bm3d(clip[, sigma, radius, ...])</code>  | A wrapper function for the BM3D denoiser.  |
| <code>lvfunc.mask.detail_mask(clip[, sigma, rad, ...])</code> | A wrapper for creating a detail mask to be used during denoising and/or debanding.   |
| <code>lvfunc.mask.halo_mask(clip[, rad, brz, ...])</code>     | A halo mask to catch basic haloing, inspired by the mask from FineDehalo.  |
| <code>lvfunc.mask.range_mask(clip[, rad, radc])</code>        | Min/max mask with separate luma/chroma radii.  |
| <code>lvfunc.misc.allow_variable([width, height, ...])</code> | Decorator allowing a variable-res and/or variable-format clip to be passed to a function that otherwise would not be able to accept it.                                      |
| <code>lvfunc.misc.chroma_injector(func)</code>                | Decorator allowing injection of reference chroma into a function which would normally only receive luma, such as an upscaler passed to <code>lvfunc.scale.descale()</code> . |
| <code>lvfunc.misc.colored_clips(amount[, ...])</code>         | Returns a list of BlankClips with unique colors in sequential or random order.   |
| <code>lvfunc.misc.edgefixer(clip[, left, right, ...])</code>  | A wrapper for ContinuityFixer ( <a href="https://github.com/MonoS/VS-ContinuityFixer">https://github.com/MonoS/VS-ContinuityFixer</a> ).                                     |
| <code>lvfunc.misc.frames_since_bookmark(clip, ...)</code>     | Displays frames since last bookmark to create easily reusable scenefiltering.  |
| <code>lvfunc.misc.get_matrix(clip)</code>                     | Helper function to get the matrix for a clip.  |
| <code>lvfunc.misc.limit_dark(clip, filtered[, ...])</code>    | Replaces frames in a clip with a filtered clip when the frame's darkness exceeds the threshold.  |
| <code>lvfunc.misc.load_bookmarks(bookmark_path)</code>        | VSEdit bookmark loader.  |
| <code>lvfunc.misc.shift_tint(clip[, values])</code>           | A function for forcibly adding pixel values to a clip.   |
| <code>lvfunc.misc.source(file[, ref, ...])</code>             | Generic clip import function.  |
| <code>lvfunc.misc.wipe_row(clip[, ref, pos, ...])</code>      | Simple function to wipe a row or column with a blank clip.   |
| <code>lvfunc.recon.chroma_reconstruct(clip[, ...])</code>     | A function to demangle messed-up chroma, like for example chroma that was downscaled using Nearest Neighbour, or the chroma found on DVDs.                                   |

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|--|--|
| <i>lvfunc.render.clip_async_render</i> (clip[, ...])     | Render a clip by requesting frames asynchronously using clip.get_frame_async, providing for callback with frame number and frame object. |
| <i>lvfunc.render.find_scene_changes</i> (clip[, mode])   | Generate a list of scene changes (keyframes).  |
| <i>lvfunc.scale.descale</i> (clip[, upscaler, ...])      | A unified descaling function.  |
| <i>lvfunc.scale.descale_detail_mask</i>                  | Generate a detail mask given a clip and a clip rescaled with the same kernel.  |
| <i>lvfunc.scale.reupscale</i>                            | A quick ‘n easy wrapper used to re-upscale a clip descaled with descale using znedi3.  |
| <i>lvfunc.scale.test_descale</i> (clip[, width, ...])    | Generic function to test descales with; descales and re-upscales a given clip, allowing you to compare the two easily.                   |
| <i>lvfunc.util.normalize_ranges</i> (clip, ranges)       | Normalize Range(s) to a list of inclusive positive integer ranges.   |
| <i>lvfunc.util.pick_removegrain</i> (clip)               | Returns rgvs.RemoveGrain if the clip is 16 bit or lower, else rgvs.RemoveGrain.  |
| <i>lvfunc.util.pick_repair</i> (clip)                    | Returns rgvs.Repair if the clip is 16 bit or lower, else rgvs.Repair.  |
| <i>lvfunc.util.quick_resample</i> (clip, function)       | A function to quickly resample to 16/8 bit and back to the original depth.   |
| <i>lvfunc.util.replace_ranges</i> (clip_a, clip_b, ...)  | A replacement for ReplaceFramesSimple that uses ints and tuples rather than a string.  |
| <i>lvfunc.util.scale_thresh</i> (thresh, clip[, assume]) | Scale binarization thresholds from float to int.   |





## LVSFUNC.AA

|  |   |
|--|---|
| <code>lvfunc.aa.clamp_aa(src, weak, strong[, ...])</code>  | Clamp stronger AAs to weaker AAs.   |
| <code>lvfunc.aa.eedi3([opencl])</code>                     | Generate eedi3 antialiaser.   |
| <code>lvfunc.aa.nnedi3([opencl])</code>                    | Generate nnedi3 antialiaser.  |
| <code>lvfunc.aa.nnedi3_clamp(clip[, strength, ...])</code> | A function that clamps eedi3 to nnedi3 for the purpose of reducing eedi3 artifacts.                       |
| <code>lvfunc.aa.taa(clip, aafun)</code>                    | Perform transpose AA.   |
| <code>lvfunc.aa.transpose_aa(clip[, eedi3, rep])</code>    | Function that performs anti-aliasing over a clip by using nnedi3/eedi3 and transposing multiple times.    |
| <code>lvfunc.aa.upscaled_sraa(clip[, rfactor, ...])</code> | A function that performs a supersampled single-rate AA to deal with heavy aliasing and broken-up lineart. |

Functions for various anti-aliasing functions and wrappers.

`lvfunc.aa.clamp_aa (src, weak, strong, strength=1)`

Clamp stronger AAs to weaker AAs. Useful for clamping upscaled\_sraa or eedi3 to nnedi3 for a strong but precise AA.

Stolen from Zastin.

### Parameters

- **src** (VideoNode) – Non-AA'd source clip.
- **weak** (VideoNode) – Weakly-AA'd clip (eg: nnedi3)
- **strong** (VideoNode) – Strongly-AA'd clip (eg: eedi3)
- **strength** (float) – Clamping strength (Default: 1)

**Return type** VideoNode

**Returns** Clip with clamped anti-aliasing.

`lvfunc.aa.eedi3 (opencl=False, **override)`

Generate eedi3 antialiaser.

Dependencies:

- vapoursynth-EEDI3

### Parameters

- **opencl** (bool) – Use OpenCL (Default: False)
- **override** (Any) – eedi3 parameter overrides

**Return type** Callable[[VideoNode], VideoNode]

**Returns** Configured eedi3 function

`lvfunc.aa.nnedi3 (opencl=False, **override)`  
Generate nnedi3 antialiaser.

Dependencies:

- vapoursynth-nnedi3
- vapoursynth-NNEDI3CL (Optional: opencl)

**Parameters**

- **opencl** (bool) – Use OpenCL (Default: False)
- **override** (Any) – nnedi3 parameter overrides

**Return type** Callable[[VideoNode], VideoNode]

**Returns** Configured nnedi3 function

`lvfunc.aa.nnedi3_clamp (clip, strength=1, mask=None, mthr=0.25, opencl=False)`

A function that clamps eedi3 to nnedi3 for the purpose of reducing eedi3 artifacts. This should fix every issue created by eedi3. For example: <https://i.imgur.com/hYVhetS.jpg>

Original function written by Zastin, modified by LightArrowsEXE.

**Parameters**

- **clip** (VideoNode) – Input clip
- **strength** (float) – Set threshold strength for over/underflow value for clamping eedi3's result to nnedi3 +/- strength \* 256 scaled to 8 bit (Default: 1)
- **mask** (Optional[VideoNode]) – Clip to use for custom mask (Default: None)
- **mthr** (float) – Binarize threshold for the mask, scaled to float (Default: 0.25)
- **opencl** (bool) – OpenCL acceleration (Default: False)

**Return type** VideoNode

**Returns** Antialiased clip

`lvfunc.aa.taa (clip, aafun)`

Perform transpose AA. Example for nnedi3cl: `taa(clip, nnedi3(opencl=True))`

**Parameters**

- **clip** (VideoNode) – Input clip.
- **aafun** (Callable[[VideoNode], VideoNode]) – Antialiasing function

**Return type** VideoNode

**Returns** Antialiased clip

`lvfunc.aa.transpose_aa (clip, eedi3=False, rep=13)`

Function that performs anti-aliasing over a clip by using nnedi3/eedi3 and transposing multiple times. This results in overall stronger anti-aliasing. Useful for shows like Yuru Camp with bad lineart problems.

Original function written by Zastin, modified by LightArrowsEXE.

Dependencies:

- RGSF (optional: 32 bit clip)

- vapoursynth-EEDI3
- vapoursynth-nnedi3
- znedi3

#### Parameters

- **clip** (VideoNode) – Input clip
- **eedi3** (bool) – Use eedi3 for the interpolation (Default: False)
- **rep** (int) – Repair mode. Pass it 0 to not repair (Default: 13)

**Return type** VideoNode

**Returns** Antialiased clip

`lvsfunc.aa.upscaled_sraa` (*clip*, *rfactor*=1.5, *width*=None, *height*=None, *supersampler*=<function *\_nnedi3\_supersample*>, *downscaler*=<bound method *Bicubic.scale* of <lvsfunc.kernels.Bicubic object>>, *aafun*=<function *\_eedi3\_singlerate*>)

A function that performs a supersampled single-rate AA to deal with heavy aliasing and broken-up lineart. Useful for heavy antialiasing.

It works by supersampling the clip, performing AA, and then downscaling again. Downscaling can be disabled by setting *downscaler* to *None*, returning the supersampled luma clip. The dimensions of the downscaled clip can also be adjusted by setting *height* or *width*. Setting either *height* or *width* will also scale the chroma accordingly.

Original function written by Zastin, heavily modified by LightArrowsEXE.

Alias for this function is *lvsfunc.sraa*.

Dependencies:

- vapoursynth-eeid3 (default aafun)
- vapoursynth-nnedi3 (default supersampler and aafun)

#### Parameters

- **clip** (VideoNode) – Input clip
- **rfactor** (float) – Image enlargement factor. 1.3..2 makes it comparable in strength to vsTAAmbk It is not recommended to go below 1.3 (Default: 1.5)
- **width** (Optional[int]) – Target resolution width. If None, determined from *height*
- **height** (Optional[int]) – Target resolution height (Default: *clip.height*)
- **supersampler** (Callable[[VideoNode, int, int], VideoNode]) – Supersampler used for upscaling before AA (Default: *nnedi3\_supersampler*)
- **downscaler** (Optional[Callable[[VideoNode, int, int], VideoNode]]) – Downscaler to use after supersampling (Default: *Bicubic(b=0, c=1/2)*)
- **aafun** (Callable[[VideoNode], VideoNode]) – Function used to antialias after supersampling (Default: *eedi3* with *nnedi3* scip)

**Return type** VideoNode

**Returns** Antialiased clip



## LVSFUNC.COMPARISON

|  |   |
|--|---|
| <code>lvsfunc.comparison.compare(clip_a, clip_b[, ...])</code> | Allows for the same frames from two different clips to be compared by interleaving them into a single clip.   |
| <code>lvsfunc.comparison.diff(*clips[, thr, ...])</code>       | Creates a standard <code>lvsfunc.comparison.Stack</code> between frames from two clips that have differences. |
| <code>lvsfunc.comparison.diff_hardsub_mask(a, b, ...)</code>   | Diff func for <code>lvsfunc.comparison.diff()</code> to use a hardsub mask.                                   |
| <code>lvsfunc.comparison.interleave(*clips, ...)</code>        | Small convenience function for interleaving clips.  |
| <code>lvsfunc.comparison.split(*clips, **named-clips)</code>   | Small convenience function for splitting clips along the x-axis and then stacking.                            |
| <code>lvsfunc.comparison.stack_compare(*clips[, ...])</code>   | A simple wrapper that allows you to compare two clips by stacking them.                                       |
| <code>lvsfunc.comparison.stack_horizontal(*clips, ...)</code>  | Small convenience function for stacking clips horizontally.   |
| <code>lvsfunc.comparison.stack_planes(clip, /[, ...])</code>   | Stacks the planes of a clip.  |
| <code>lvsfunc.comparison.stack_vertical(*clips, ...)</code>    | Small convenience function for stacking clips vertically.   |
| <code>lvsfunc.comparison.tile(*clips, **named-clips)</code>    | Small convenience function for tiling clips in a rectangular pattern.   |

Functions intended to be used to make comparisons between different sources or to be used to analyze something from a single clip.

**class** `lvsfunc.comparison.Comparer` (*clips*, /, \*, *label\_alignment*=7)

Bases: `abc.ABC`

Base class for comparison functions.

### Parameters

- **clips** (`Union[Dict[str, VideoNode], Sequence[VideoNode]]`) – A dict mapping names to clips or simply a sequence of clips in a tuple or a list. If given a dict, the names will be overlayed on the clips using `VideoNode.text.Text`. If given a simple sequence of clips, the *label\_alignment* parameter will have no effect and the clips will not be labeled. The order of the clips in either a dict or a sequence will be kept in the comparison.
- **label\_alignment** (`int`) – An integer from 1-9, corresponding to the positions of the keys on a numpad. Only used if *clips* is a dict. Determines where to place clip name using `VideoNode.text.Text` (Default: 7)

### property clip

Returns the comparison as a single `VideoNode` for further manipulation or attribute inspection.

`comp_clip = Comparer(...).clip` is the intended use in encoding scripts.

**Return type** `VideoNode`

**class** `lvfunc.comparison.Direction` (*value*)

Bases: `enum.IntEnum`

Enum to simplify direction argument.

**HORIZONTAL** = 0

**VERTICAL** = 1

**class** `lvfunc.comparison.Interleave` (*clips*, /, \*, *label\_alignment*=7)

Bases: `lvfunc.comparison.Comparer`

From the VapourSynth documentation: *Returns a clip with the frames from all clips interleaved. For example, Interleave(A=clip1, B=clip2) will return A.Frame 0, B.Frame 0, A.Frame 1, B.Frame 1, ...*

Acts as a convenience combination function of `vapoursynth.core.text.Text` and `vapoursynth.core.std.Interleave`.

#### Parameters

- **clips** (`Union[Dict[str, VideoNode], Sequence[VideoNode]]`) – A dict mapping names to clips or simply a sequence of clips in a tuple or a list. If given a dict, the names will be overlayed on the clips using `VideoNode.text.Text`. If given a simple sequence of clips, the *label\_alignment* parameter will have no effect and the clips will not be labeled. The order of the clips in either a dict or a sequence will be kept in the comparison.
- **label\_alignment** (`int`) – An integer from 1-9, corresponding to the positions of the keys on a numpad. Only used if *clips* is a dict. Determines where to place clip name using `VideoNode.text.Text` (Default: 7)

**class** `lvfunc.comparison.Split` (*clips*, /, \*, *direction*=`<Direction.HORIZONTAL: 0>`, *label\_alignment*=7)

Bases: `lvfunc.comparison.Stack`

Split an unlimited amount of clips into one `VideoNode` with the same dimensions as the original clips. Handles odd-sized resolutions or resolutions that can't be evenly split by the amount of clips specified.

The remaining pixel width/height (`clip.dimension % number_of_clips`) will be always given to the last clip specified. For example, five *104 x 200* clips will result in a  $((20 \times 200) * 4) + (24 \times 200)$  horizontal stack of clips.

#### Parameters

- **clips** (`Union[Dict[str, VideoNode], Sequence[VideoNode]]`) – A dict mapping names to clips or simply a sequence of clips in a tuple or a list. If given a dict, the names will be overlayed on the clips using `VideoNode.text.Text`. If given a simple sequence of clips, the *label\_alignment* parameter will have no effect and the clips will not be labeled. The order of the clips in either a dict or a sequence will be kept in the comparison.
- **direction** (`Direction`) – Determines the axis to split the clips on (Default: `lvfunc.comparison.Direction.HORIZONTAL`)
- **label\_alignment** (`int`) – An integer from 1-9, corresponding to the positions of the keys on a numpad. Only used if *clips* is a dict. Determines where to place clip name using `VideoNode.text.Text` (Default: 7)

**class** `lvfunc.comparison.Stack` (*clips*, /, \*, *direction*=`<Direction.HORIZONTAL: 0>`, *label\_alignment*=7)

Bases: `lvfunc.comparison.Comparer`

Stacks clips horizontally or vertically.

Acts as a convenience combination function of `vapoursynth.core.text.Text` and either `vapoursynth.core.std.StackHorizontal` or `vapoursynth.core.std.StackVertical`.

### Parameters

- **clips** (`Union[Dict[str, VideoNode], Sequence[VideoNode]]`) – A dict mapping names to clips or simply a sequence of clips in a tuple or a list. If given a dict, the names will be overlayed on the clips using `VideoNode.text.Text`. If given a simple sequence of clips, the `label_alignment` parameter will have no effect and the clips will not be labeled. The order of the clips in either a dict or a sequence will be kept in the comparison.
- **direction** (`Direction`) – Direction of the stack (Default: `lvfunc.comparison.Direction.HORIZONTAL`)
- **label\_alignment** (`int`) – An integer from 1-9, corresponding to the positions of the keys on a numpad. Only used if `clips` is a dict. Determines where to place clip name using `VideoNode.text.Text` (Default: 7)

**class** `lvfunc.comparison.Tile` (`clips, /, *, arrangement=None, label_alignment=7`)

Bases: `lvfunc.comparison.Comparer`

Tiles clips in a mosaic manner, filling rows first left-to-right, then stacking.

The arrangement of the clips can be specified with the `arrangement` parameter. Rows are specified as lists of ints inside of a larger list specifying the order of the rows. Think of this as a 2-dimensional array of 0s and 1s with 0 representing an empty slot and 1 representing the next clip in the sequence.

If `arrangement` is not specified, the function will attempt to fill a square with dimensions  $n \times n$  where  $n$  is equivalent to `math.ceil(math.sqrt(len(clips)))`. The bottom rows will be dropped if empty.

```
# For example, for 3 clips, the automatic arrangement becomes:
[
  [1, 1],
  [1, 0]
]

# For 10 clips, the automatic arrangement becomes:
[
  [1, 1, 1, 1],
  [1, 1, 1, 1],
  [1, 1, 0, 0]
]

# For custom arrangements, such as (for 4 clips):
[
  [0, 1, 0, 1],
  [1],
  [0, 1]
]
# the rows will be auto-padded with 0's to be the same length.
```

### Parameters

- **clips** (`Union[Dict[str, VideoNode], Sequence[VideoNode]]`) – A dict mapping names to clips or simply a sequence of clips in a tuple or a list. If given a dict, the names will be overlayed on the clips using `VideoNode.text.Text`. If given a simple sequence of clips, the `label_alignment` parameter will have no effect and the clips will not be labeled. The order of the clips in either a dict or a sequence will be kept in the comparison.

- **arrangement** (Optional[List[List[int]]) – 2-dimension array (list of lists) of 0s and 1s representing a list of rows of clips(1) or blank spaces(0) (Default: None)
- **label\_alignment** (int) – An integer from 1-9, corresponding to the positions of the keys on a numpad. Only used if *clips* is a dict. Determines where to place clip name using `VideoNode.text.Text` (Default: 7)

`lvsfunc.comparison.compare` (*clip\_a*, *clip\_b*, *frames=None*, *rand\_total=None*, *force\_resample=True*, *print\_frame=True*, *mismatch=False*)

Allows for the same frames from two different clips to be compared by interleaving them into a single clip. Clips are automatically resampled to 8 bit YUV -> RGB24 to emulate how a monitor shows the frame. This can be disabled by setting *force\_resample* to `False`.

Alias for this function is `lvsfunc.comp`.

#### Parameters

- **clip\_a** (VideoNode) – Clip to compare
- **clip\_b** (VideoNode) – Second clip to compare
- **frames** (Optional[List[int]]) – List of frames to compare (Default: None)
- **rand\_total** (Optional[int]) – Number of random frames to pick (Default: None)
- **force\_resample** (bool) – Forcibly resamples the clip to RGB24 (Default: True)
- **print\_frame** (bool) – Print frame numbers (Default: True)
- **mismatch** (bool) – Allow for clips with different formats and dimensions to be compared (Default: False)

**Return type** VideoNode

**Returns** Interleaved clip containing specified frames from *clip\_a* and *clip\_b*

`lvsfunc.comparison.diff` (\**clips*, *thr=72*, *height=288*, *return\_array=False*, *return\_frames=False*, *diff\_func=<function <lambda>>*, \*\**namedclips*)

Creates a standard `lvsfunc.comparison.Stack` between frames from two clips that have differences. Useful for making comparisons between TV and BD encodes, as well as clean and hardsubbed sources.

There are two methods used here to find differences. If *thr* is below 1, `PlaneStatsDiff` is used to figure out the differences. Else, if *thr* is equal than or higher than 1, `PlaneStatsMin/Max` are used.

Recommended is `PlaneStatsMin/Max`, as those seem to catch more outrageous differences more easily and not return too many starved frames.

Note that this might catch artifacting as differences! Make sure you verify every frame with your own eyes!

Alias for this function is `lvsfunc.diff`.

#### Parameters

- **clips** (VideoNode) – Clips for comparison (order is kept)
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the top left with their *name*.
- **thr** (float) – Threshold,  $\leq 1$  uses `PlaneStatsDiff`,  $>1$  uses `Max/Min`. Value must be below 128 (Default: 72)
- **height** (int) – Height in px to downscale clips to if *return\_array* is `False` (`MakeDiff` clip will be twice this resolution) (Default: 288)
- **return\_array** (bool) – Return frames as an interleaved comparison (using `lvsfunc.comparison.Interleave`) (Default: False)



- **return\_frames** (bool) – Adds *frames list* to the return. (Default: False)
- **diff\_func** (Callable[[VideoNode, VideoNode], VideoNode]) – Function for calculating diff in PlaneStatsMin/Max mode. (Default: core.std.MakeDiff)

**Return type** Union[VideoNode, Tuple[VideoNode, List[int]]]

**Returns** Either an interleaved clip of the differences between the two clips or a stack of both input clips on top of MakeDiff clip. Optionally, you can allow the function to also return a list of frames as well.

`lvfunc.comparison.diff_hardsub_mask(a, b, **kwargs)`

Diff func for `lvfunc.comparison.diff()` to use a hardsub mask. This is kinda slow.

**Parameters**

- **a** (VideoNode) – Clip A
- **b** (VideoNode) – Clip B

**Return type** VideoNode

**Returns** Diff masked with `lvfunc.dehardsub.hardsub_mask()`

`lvfunc.comparison.interleave(*clips, **namedclips)`

Small convenience function for interleaving clips.

**Parameters**

- **clips** (VideoNode) – Clips for comparison (order is kept)
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the top left with their *name*.

**Return type** VideoNode

**Returns** An interleaved clip of all the *clips/namedclips* specified

`lvfunc.comparison.split(*clips, **namedclips)`

Small convenience function for splitting clips along the x-axis and then stacking. Accounts for odd-resolution clips by giving overflow columns to the last clip specified. All clips must have the same dimensions (width and height).

**Parameters**

- **clips** (VideoNode) – Clips for comparison (order is kept left to right)
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the bottom with their *name*.

**Return type** VideoNode

**Returns** A clip with the same dimensions as any one of the input clips with all *clips/namedclips* represented as individual vertical slices.

`lvfunc.comparison.stack_compare(*clips, make_diff=True, height=288, warn=None)`

A simple wrapper that allows you to compare two clips by stacking them.

Best to use when trying to match two sources frame-accurately. Alias for this function is `lvfunc.scomp`.

**Parameters**

- **clips** (VideoNode) – Clips to compare
- **make\_diff** (bool) – Create and stack a diff (only works if two clips are given) (Default: True)

- **height** (int) – Height in px to rescale clips to if *make\_diff* is True (MakeDiff clip will be twice this resolution) (Default: 288)
- **warn** (Optional[Any]) – Unused parameter kept for backward compatibility

**Return type** VideoNode

**Returns** Clip with *clips* stacked

`lvfunc.comparison.stack_horizontal (*clips, **namedclips)`

Small convenience function for stacking clips horizontally.

**Parameters**

- **clips** (VideoNode) – Clips for comparison (order is kept left to right)
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the top left with their *name*.

**Return type** VideoNode

**Returns** A horizontal stack of the *clips/namedclips*

`lvfunc.comparison.stack_planes (clip, /, stack_vertical=False)`

Stacks the planes of a clip. For 4:2:0 subsampled clips, the two half-sized planes will be stacked in the opposite direction specified (vertical by default), then stacked with the full-sized plane in the direction specified (horizontal by default).

**Parameters**

- **clip** (VideoNode) – Input clip (must be in YUV or RGB planar format)
- **stack\_vertical** (bool) – Stack the planes vertically (Default: False)

**Return type** VideoNode

**Returns** Clip with stacked planes

`lvfunc.comparison.stack_vertical (*clips, **namedclips)`

Small convenience function for stacking clips vertically.

**Parameters**

- **clips** (VideoNode) – Clips for comparison (order is kept top to bottom)
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the top left with their *name*.

**Return type** VideoNode

**Returns** A vertical stack of the *clips/namedclips*

`lvfunc.comparison.tile (*clips, **namedclips)`

Small convenience function for tiling clips in a rectangular pattern. All clips must have the same dimensions (width and height). If 3 clips are given, a 2x2 square with one blank slot will be returned. If 6 clips are given, a 3x2 rectangle will be returned.

**Parameters**

- **clips** (VideoNode) – Clips for comparison
- **namedclips** (VideoNode) – Keyword arguments of *name=clip* for all clips in the comparison. Clips will be labeled at the top left with their *name*.

**Return type** VideoNode

**Returns** A clip with all input *clips/namedclips* automatically tiled most optimally into a rectangular arrangement



## LVSFUNC.DEBLOCK

---

|  |  |
|--|--|
| <code>lvsvfunc.deblock.autodb_dpir(clip[, ...])</code> | A rewrite of <code>fvsvfunc.AutoDeblock</code> that uses <code>vspdir</code> instead of <code>dfttest</code> to deblock. |
|--|--|

---

Deblocking functions.

```
lvsvfunc.deblock.autodb_dpir(clip, edgevalue=24, str=[30, 50, 75], thrs=[(1.5, 2.0, 2.0), (3.0,
4.5, 4.5), (5.5, 7.0, 7.0)], matrix=None, cuda=True, device_index=0,
write_props=False)
```

A rewrite of `fvsvfunc.AutoDeblock` that uses `vspdir` instead of `dfttest` to deblock.

This function checks for differences between a frame and an edgemask with some processing done on it, and for differences between the current frame and the next frame. For frames where both thresholds are exceeded, it will perform deblocking at a specified strength. This will ideally be frames that show big temporal *and* spatial inconsistencies.

Thresholds and calculations are added to the frameprops to use as reference when setting the thresholds.

Keep in mind that `vspdir` is not perfect; it may cause weird, black dots to appear sometimes. If that happens, you can perform a denoise on the original clip (maybe even using `vspdir`'s denoising mode) and grab the brightest pixels from your two clips. That should return a perfectly fine clip.

Thanks Vardë, louis, setsugen\_no\_ao!

Dependencies:

- `vs-dpir`

### Parameters

- **clip** (`VideoNode`) – Input clip
- **edgevalue** (`int`) – Remove edges from the edgemask that exceed this threshold (higher means more edges removed)
- **strs** (`Sequence[float]`) – A list of DPIR strength values (higher means stronger deblocking). You can pass any arbitrary number of values here. The amount of values in `strs` and `thrs` need to be equal.
- **thrs** (`Sequence[Tuple[float, float, float]]`) – A list of thresholds, written as `[(EdgeValRef, NextFrameDiff, PrevFrameDiff)]`. You can pass any arbitrary number of values here. The amount of values in `strs` and `thrs` need to be equal.
- **matrix** (`Optional[Matrix]`) – Enum for the matrix of the input clip. See `types.Matrix` for more info. If `None`, gets matrix from the “\_Matrix” prop of the clip
- **cuda** (`bool`) – Device type used for deblocking. Uses CUDA if `True`, else CPU

- **device\_index** (int) – The ‘device\_index’ + 1° device of type device type in the system

:write\_props Will write verbose props

**Return type** VideoNode

**Returns** Deblocked clip

## LVSFUNC.DEHALO

|  |  |
|--|--|
| <code>lvsvfunc.dehalo.bidehalo</code> (clip[, ref, sigmaS, ...]) | A simple dehaloing function using bilateral and BM3D to remove bright haloing around edges.  |
| <code>lvsvfunc.dehalo.deemphasize</code> (clip[, strength, ...]) | A function that attempts to deemphasize ringing common to SD video signals resulting from a playback device in the transfer chain poorly compensating for pre-emphasis baked into the source signal. |

Wrappers for dehaloing functions.

`lvsvfunc.dehalo.bidehalo`(clip, ref=None, sigmaS=1.5, sigmaR=0.0196078431372549, sigmaS\_final=None, sigmaR\_final=None, bilateral\_args={}, bm3d\_args={})

A simple dehaloing function using bilateral and BM3D to remove bright haloing around edges. If a ref clip is passed, that will be masked onto the clip instead of a blurred clip.

#### Parameters

- **clip** (VideoNode) – Source clip
- **ref** (Optional[VideoNode]) – Ref clip
- **sigmaS** (float) – Bilateral’s spatial weight sigma
- **sigmaR** (float) – Bilateral’s range weight sigma
- **sigmaS\_final** (Optional[float]) – Final bilateral call’s spatial weight sigma. You’ll want this to be much weaker than the initial *sigmaS*. If *None*, 1/3rd of *sigmaS*.
- **sigmaR\_final** (Optional[float]) – Bilateral’s range weight sigma. if *None*, same as *sigmaR*
- **bilateral\_args** (Dict[str, Any]) – Additional parameters to pass to bilateral
- **bm3d\_args** (Dict[str, Any]) – Additional parameters to pass to `lvsvfunc.denoise.bm3d`

**Return type** VideoNode

**Returns** Dehalo’d clip

`lvsvfunc.dehalo.deemphasize`(clip, strength=95, interlaced=False, TFF=True)

A function that attempts to deemphasize ringing common to SD video signals resulting from a playback device in the transfer chain poorly compensating for pre-emphasis baked into the source signal.

Ported and modified from an AVS gist: <https://gist.github.com/acuozzo/940869257cc79016215600a2392b33eb>. This was mainly ported as an exercise. Usefulness not guaranteed.

Dependencies:

- `fmtconv`

**Parameters**

- **clip** (`VideoNode`) – Source clip
- **strength** (`int`) – Gauss strength, lower is stronger. Ranged 1–100
- **interlaced** (`bool`) – Whether the clip is interlaced or not
- **TFF** (`bool`) – Top Field First if True, else Bottom Field First

**Return type** `VideoNode`

**Returns** Deringed clip



## LVSFUNC.DEHARDSUB

|   |  |
|---|--|
| <code>lvfunc.dehardsub.bounded_dehardsub(hrdsb, ...)</code>   | Apply a list of <code>lvfunc.dehardsub.HardsubSign</code>      |
| <code>lvfunc.dehardsub.get_all_masks(hrdsb, ref, ...)</code>  | Get a clip of <code>lvfunc.dehardsub.HardsubSign</code> masks. |
| <code>lvfunc.dehardsub.hardsub_mask(hrdsb, ref[, ...])</code> | Zastin's spatially-aware hardsub mask.                         |

**class** `lvfunc.dehardsub.HardsubMask` (*ranges=None, bound=None, \*, blur=False, ref-frames=None*)

Bases: `lvfunc.mask.DeferredMask`, `abc.ABC`

Dehardsub masking interface.

Provides extra functions potentially useful for dehardsubbing.

### Parameters

- **range** – A single range or list of ranges to replace, compatible with `lvfunc.misc.replace_ranges`
- **bound** (Union[`BoundingBox`, Tuple[Tuple[int, int], Tuple[int, int]], None]) – A `lvfunc.mask.BoundingBox` or a tuple that will be converted. (Default: None, no bounding)
- **blur** (bool) – Blur the bounding mask (Default: True)
- **refframe** – A single frame number to use to generate the mask or a list of frame numbers with the same length as `range`

**get\_progressive\_dehardsub** (*hrdsb, ref, partials*)

Dehardsub using multiple superior hardsubbed sources and one inferior non-subbed source.

### Parameters

- **hrdsb** (`VideoNode`) – Hardsub master source (eg Wakanim RU dub)
- **ref** (`VideoNode`) – Non-subbed reference source (eg CR, Funi, Amazon)
- **partials** (List[`VideoNode`]) – Sources to use for partial dehardsubbing (eg Waka DE, FR, SC)

**Return type** Tuple[List[`VideoNode`], List[`VideoNode`]]

**Returns** Dehardsub stages and masks used for progressive dehardsub

**apply\_dehardsub** (*hrdsb, ref, partials*)

Apply dehardsubbing to a clip.

**Parameters**

- **hrdsb** (VideoNode) – Hardsubbed source
- **ref** (VideoNode) – Non-hardsubbed source
- **partials** (Optional[List[VideoNode]]) – Other hardsubbed sources

**Return type** VideoNode**Returns** Dehardsubbed clip**ranges:** List[Union[int, None, Tuple[Optional[int], Optional[int]]]]**bound:** Optional[lvfunc.mask.BoundingBox]**refframes:** List[Optional[int]]**blur:** bool

```
class lvfunc.dehardsub.HardsubSign(*args, thresh=0.06, minimum=1, expand=8, inflate=7,  
                                  **kwargs)
```

Bases: *lvfunc.dehardsub.HardsubMask*

Hardsub scenefiltering helper using Zastin's hardsub mask.

**Parameters**

- **thresh** (float) – Binarization threshold, [0, 1] (Default: 0.06)
- **expand** (int) – std.Maximum iterations (Default: 8)
- **inflate** (int) – std.Inflate iterations (Default: 7)

**thresh:** float**minimum:** int**expand:** int**inflate:** int

```
class lvfunc.dehardsub.HardsubSignKgf(*args, highpass=5000, expand=8, **kwargs)
```

Bases: *lvfunc.dehardsub.HardsubMask*

Hardsub scenefiltering helper using kgf.hardsubmask\_fades.

Dependencies:

- kagefunc

**Parameters**

- **highpass** (int) – Highpass filter for hardsub detection (16-bit, Default: 5000)
- **expand** (int) – kgf.hardsubmask\_fades expand parameter (Default: 8)

**highpass:** int**expand:** int

```
class lvfunc.dehardsub.HardsubLine(*args, expand=None, **kwargs)
```

Bases: *lvfunc.dehardsub.HardsubMask*

Hardsub scenefiltering helper using kgf.hardsubmask.

Dependencies:

- kagefunc

**Parameters** **expand** (Optional[int]) – kgf.hardsubmask expand parameter (Default: clip.width // 200)

**expand:** Optional[int]

**class** lvfunc.dehardsub.HardsubLineFade (ranges, \*args, refframe=0.5, \*\*kwargs)

Bases: [lvfunc.dehardsub.HardsubLine](#)

Hardsub scenefiltering helper using kgf.hardsubmask. Similar to [lvfunc.dehardsub.HardsubLine](#) but automatically sets the reference frame to the range's midpoint.

**Parameters** **refframe** (float) – Desired reference point as a percent of the frame range. 0 = first frame, 1 = last frame, 0.5 = midpoint (Default)

**ref\_float:** float

**get\_mask** (clip, ref)

Get the bounded mask.

**Parameters**

- **clip** (VideoNode) – Source
- **ref** (VideoNode) – Reference clip

**Return type** VideoNode

**Returns** Bounded mask

Dehardsubbing helpers.

**class** lvfunc.dehardsub.HardsubASS (filename, \*args, fontdir=None, shift=None, \*\*kwargs)

Bases: [lvfunc.dehardsub.HardsubMask](#)

Generate a mask using an ass script, such as for dehardubbing AoD with CR DE.

**Parameters**

- **filename** (str) – Path to ASS script.
- **fontdir** (Optional[str]) – Extra fonts path.
- **shift** (Optional[int]) – Offset to apply to the script, in frames. May misbehave due to timestamp rounding.

**filename:** str

**fontdir:** Optional[str]

**shift:** Optional[int]

**class** lvfunc.dehardsub.HardsubSignFade (ranges, \*args, refframe=0.5, \*\*kwargs)

Bases: [lvfunc.dehardsub.HardsubSign](#)

Hardsub scenefiltering helper using Zastin's sign mask. Similar to [lvfunc.dehardsub.HardsubSign](#) but automatically sets the reference frame to the range's midpoint.

**Parameters** **refframe** (float) – Desired reference point as a percent of the frame range. 0 = first frame, 1 = last frame, 0.5 = midpoint (Default)

**get\_mask** (clip, ref)

Get the bounded mask.

**Parameters**

- **clip** (VideoNode) – Source

- **ref** (VideoNode) – Reference clip

**Return type** VideoNode

**Returns** Bounded mask

**ref\_float:** float

`lvfunc.dehardsub.bounded_dehardsub (hrdsb, ref, signs, partials=None)`

Apply a list of `lvfunc.dehardsub.HardsubSign`

**Parameters**

- **hrdsb** (VideoNode) – Hardsubbed source
- **ref** (VideoNode) – Reference clip
- **signs** (List[`HardsubMask`]) – List of `lvfunc.dehardsub.HardsubSign` to apply

**Return type** VideoNode

**Returns** Dehardsubbed clip

`lvfunc.dehardsub.get_all_masks (hrdsb, ref, signs)`

Get a clip of `lvfunc.dehardsub.HardsubSign` masks.

**Parameters**

- **hrdsb** (VideoNode) – Hardsubbed source
- **ref** (VideoNode) – Reference clip
- **signs** (List[`HardsubMask`]) – List of `lvfunc.dehardsub.HardsubSign` to generate masks for

**Return type** VideoNode

**Returns** Clip of all hardsub masks

`lvfunc.dehardsub.hardsub_mask (hrdsb, ref, thresh=0.06, minimum=1, expand=8, inflate=7)`

Zastin's spatially-aware hardsub mask.

**Parameters**

- **hrdsb** (VideoNode) – Hardsubbed source
- **ref** (VideoNode) – Reference clip
- **thresh** (float) – Binarization threshold, [0, 1] (Default: 0.06)
- **minimum** (int) – Times to minimize the max (Default: 1)
- **expand** (int) – Times to maximize the mask (Default: 8)
- **inflate** (int) – Times to inflate the mask (Default: 7)

**Return type** VideoNode

**Returns** Hardsub mask

## LVSFUNC.DEINTERLACE

|  |   |
|--|---|
| <code>lvsvfunc.deinterlace.deblend(clip[, rep])</code>       | A simple function to fix deblending for interlaced video with an AABBA blending pattern, where A is a regular frame and B is a blended frame. |
| <code>lvsvfunc.deinterlace.decomb(clip, TFF[, ...])</code>   | A filter that performs relatively aggressive filtering to get rid of the combing on a interlaced/telecined source.                            |
| <code>lvsvfunc.deinterlace.dir_deshimmer(clip[, ...])</code> | Directional deshimmering function.  |
| <code>lvsvfunc.deinterlace.dir_unsharp(clip[, ...])</code>   | Diff'd directional unsharpening function.   |
| <code>lvsvfunc.deinterlace.SIVTC(clip, pattern, ...)</code>  | A very simple fieldmatching function.   |
| <code>lvsvfunc.deinterlace.TIVTC_VFR(clip[, ...])</code>     | Wrapper for performing TFM and TDecimate on a clip that is supposed to be VFR, including generating a metrics/matches/timcodes txt file.      |

Functions to help with deinterlacing or deinterlaced content.

`lvsvfunc.deinterlace.SIVTC(clip, pattern=0, TFF=True, decimate=True)`

A very simple fieldmatching function.

This is essentially a stripped-down JIVTC offering JUST the basic fieldmatching and decimation part. As such, you may need to combine multiple instances if patterns change throughout the clip.

### Parameters

- **clip** (VideoNode) – Input clip
- **pattern** (int) – First frame of any clean-combed-combed-clean-clean sequence
- **TFF** (bool) – Top-Field-First
- **decimate** (bool) – Drop a frame every 5 frames to get down to 24000/1001

**Return type** VideoNode

**Returns** IVTC'd clip

`lvsvfunc.deinterlace.TIVTC_VFR(clip, tfm_in='ivtc/matches.txt', tdec_in='ivtc/metrics.txt', timcodes_out='ivtc/timcodes.txt', tfm_args={}, tdecimate_args={})`

Wrapper for performing TFM and TDecimate on a clip that is supposed to be VFR, including generating a metrics/matches/timcodes txt file.

Largely based on, if not basically rewritten from, atomchtools.TIVTC\_VFR.

Dependencies:

- TIVTC

**Parameters**

- **clip** (VideoNode) – Input clip
- **tfmIn** – File location for TFM’s matches analysis
- **tdecIn** – File location for TDecimate’s metrics analysis
- **mkvOut** – File location for TDecimate’s timecode file output
- **tfm\_args** (Dict[str, Any]) – Additional arguments to pass to TFM
- **tdecimate\_args** (Dict[str, Any]) – Additional arguments to pass to TDecimate

**Return type** VideoNode

**Returns** IVTC’d VFR clip

`lvsfunc.deinterlace.deblend(clip, rep=None)`

A simple function to fix deblending for interlaced video with an AABBA blending pattern, where A is a regular frame and B is a blended frame.

Assuming there’s a constant pattern of frames (labeled A, B, C, CD, and DA in this function), blending can be fixed by calculating the D frame by getting halves of CD and DA, and using that to fix up CD. DA is then dropped because it’s a duplicated frame.

Doing this will result in some of the artifacting being added to the deblended frame, but we can mitigate that by repairing the frame with the non-blended frame before it.

For more information, please refer to this blogpost by torchlight: <https://mechaweaponsvidya.wordpress.com/2012/09/13/adventures-in-deblending/>

Dependencies:

- RGSF (optional: 32 bit clip)

**Parameters**

- **clip** (VideoNode) – Input clip
- **rep** (Optional[int]) – Repair mode for the deblended frames, no repair if None (Default: None)

**Return type** VideoNode

**Returns** Deblended clip

`lvsfunc.deinterlace.decomb(clip, TFF, mode=1, ref=None, decimate=True, vinv=False, sharpen=False, dir='v', rep=None, show_mask=False, **kwargs)`

A filter that performs relatively aggressive filtering to get rid of the combing on a interlaced/telecined source. Decimation can be disabled if the user wishes to decimate the clip themselves. Enabling vinverse will result in more aggressive decombining at the cost of potential detail loss. Sharpen will perform a directional unsharpening. Direction can be set using *dir*. A reference clip can be passed with *ref*, which will be used by VFM to create the output frames.

Base function written by Midlifecrisis from the WEEB AUTISM server, and modified by LightArrowsEXE.

Dependencies:

- combmask
- havsfunc

- RGSF (optional: 32 bit clip)

#### Parameters

- **clip** (VideoNode) – Input clip
- **TFF** (bool) – Top-Field-First
- **mode** (int) – Sets the matching mode or strategy to use for VFM
- **ref** (Optional[VideoNode]) – Reference clip for VFM’s *clip2* parameter
- **decimate** (bool) – Decimate the video after deinterlacing (Default: True)
- **vinv** (bool) – Use vinverse to get rid of additional combing (Default: False)
- **sharpen** (bool) – Unsharpen after deinterlacing (Default: False)
- **dir** (str) – Directional vector. ‘v’ = Vertical, ‘h’ = Horizontal (Default: v)
- **rep** (Optional[int]) – Repair mode for repairing the decomed clip using the original clip (Default: None)
- **show\_mask** (bool) – Return combmask
- **kwargs** (Any) – Arguments to pass to QTGMC (Default: SourceMatch=3, Lossless=2, TR0=1, TR1=2, TR2=3, FPSDivisor=2)

**Return type** VideoNode

**Returns** Decomed and optionally decimated clip

`lvfunc.deinterlace.dir_deshimmer(clip, TFF=True, dh=False, transpose=True, show_mask=False)`

Directional deshimmering function.

Only works (in the few instances it does, anyway) for obvious horizontal and vertical shimmering. Odds of success are low. But if you’re desperate, it’s worth a shot.

Dependencies:

- vapoursynth-nnedi3

#### Parameters

- **clip** (VideoNode) – Input clip
- **TFF** (bool) – Top Field First. Set to False if TFF doesn’t work (Default: True)
- **dh** (bool) – Interpolate to double the height of given clip beforehand (Default: False)
- **transpose** (bool) – Transpose the clip before attempting to deshimmer (Default: True)
- **show\_mask** (bool) – Show nnedi3’s mask (Default: False)

**Return type** VideoNode

**Returns** Deshimmered clip

`lvfunc.deinterlace.dir_unsharp(clip, strength=1.0, dir='v', h=3.4)`

Diff’d directional unsharpening function. Performs one-dimensional sharpening as such: “Original + (Original - blurred) \* Strength”

This particular function is recommended for SD content, specifically after deinterlacing.

Special thanks to thebombzen and kageru for writing the bulk of this.

Dependencies:

- knlmeanscl

**Parameters**

- **clip** (VideoNode) – Input clip
- **strength** (float) – Amount to multiply blurred clip with original clip by (Default: 1.0)
- **dir** (str) – Directional vector. ‘v’ = Vertical, ‘h’ = Horizontal (Default: v)
- **h** (float) – Sigma for knlmeans, to prevent noise from getting sharpened (Default: 3.4)

**Return type** VideoNode

**Returns** Unsharpened clip



## LVSFUNC.DENOISE

---

```
lvsfunc.denoise.bm3d(clip[, sigma, radius, ...])
```

---

Denoising functions.

```
lvsfunc.denoise.bm3d(clip, sigma=0.75, radius=None, ref=None, pre=None, refine=1, matrix_s='709', basic_args={}, final_args={})
```

A wrapper function for the BM3D denoiser.

Dependencies:

- VapourSynth-BM3D

### Parameters

- **clip** (VideoNode) – Input clip
- **sigma** (Union[float, List[float]]) – Denoising strength for both basic and final estimations
- **radius** (Union[int, List[int], None]) – Temporal radius for both basic and final estimations
- **ref** (Optional[VideoNode]) – Reference clip for the final estimation
- **pre** (Optional[VideoNode]) – Prefiltered clip for the basic estimation
- **refine** (int) – Iteration of the final clip. 0 = basic estimation only 1 = basic + final estimation n = basic + n final estimations
- **matrix\_s** (str) – Color matrix of the input clip
- **basic\_args** (Dict[str, Any]) – Args to pass to the basic estimation
- **final\_args** (Dict[str, Any]) – Args to pass to the final estimation

**Return type** VideoNode

**Returns** Denoised clip



## LVSFUNC.MASK

|  |  |
|--|--|
| <code>lvfunc.mask.detail_mask</code> (clip[, sigma, rad, ...]) | A wrapper for creating a detail mask to be used during denoising and/or debanding. |
| <code>lvfunc.mask.halo_mask</code> (clip[, rad, brz, ...])     | A halo mask to catch basic haloing, inspired by the mask from FineDehalo.          |
| <code>lvfunc.mask.range_mask</code> (clip[, rad, radc])        | Min/max mask with separate luma/chroma radii.                                      |

**class** `lvfunc.mask.BoundingBox` (*pos, size*)

Bases: `object`

A positional bounding box. Basically `kagefunc.squaremask` but can be configured then deferred.

Uses `Position` + `Size`, like provided by GIMP's rectangle selection tool.

### Parameters

- **pos** (`Union[Position, Tuple[int, int]]`) – Offset of top-left corner of the bounding box from the top-left corner of the frame. Supports either a `lvfunc.types.Position` or a tuple that will be converted.
- **size** (`Union[Size, Tuple[int, int]]`) – Offset of the bottom-right corner of the bounding box from the top-left corner of the bounding box. Supports either a `lvfunc.types.Size` or a tuple that will be converted.

**pos:** `lvfunc.types.Position`

**size:** `lvfunc.types.Size`

**get\_mask** (*ref*)

Get a mask representing the bounding box

**Parameters** **ref** (`VideoNode`) – Reference clip for format, resolution, and length.

**Return type** `VideoNode`

**Returns** Square mask representing the bounding box.

**class** `lvfunc.mask.DeferredMask` (*ranges=None, bound=None, \*, blur=False, refframes=None*)

Bases: `abc.ABC`

Deferred masking interface.

Provides an interface to use different preconfigured masking functions. Provides support for ranges, reference frames, and bounding.

### Parameters

- **range** – A single range or list of ranges to replace, compatible with `lvfunc.misc.replace_ranges`

- **bound** (Union[*BoundingBox*, Tuple[Tuple[int, int], Tuple[int, int]], None]) – A *lvfunc.mask.BoundingBox* or a tuple that will be converted. (Default: None, no bounding)
- **blur** (bool) – Blur the bounding mask (Default: False)
- **refframe** – A single frame number to use to generate the mask or a list of frame numbers with the same length as *range*

**ranges:** List[Union[int, None, Tuple[Optional[int], Optional[int]]]]

**blur:** bool

**bound:** Optional[*lvfunc.mask.BoundingBox*]

**refframes:** List[Optional[int]]

**get\_mask** (*clip*, *ref*)

Get the bounded mask.

#### Parameters

- **clip** (VideoNode) – Source
- **ref** (VideoNode) – Reference clip

**Return type** VideoNode

**Returns** Bounded mask

Wrappers and masks for denoising.

*lvfunc.mask.detail\_mask* (*clip*, *sigma=None*, *rad=3*, *radc=2*, *brz\_a=0.025*, *brz\_b=0.045*)

A wrapper for creating a detail mask to be used during denoising and/or debanding. The detail mask is created using *debandshit*'s range mask, and is then merged with *Prewitt* to catch lines it may have missed.

Function is curried to allow parameter tuning when passing to denoisers that allow you to pass your own mask.

Dependencies:

- *VapourSynth-Bilateral* (optional: *sigma*)
- *RGSF* (optional: 32 bit clip)

#### Parameters

- **clip** (VideoNode) – Input clip
- **sigma** (Optional[float]) – Sigma for *Bilateral* for pre-blurring (Default: False)
- **rad** (int) – The luma equivalent of *gradfun3*'s "mask" parameter
- **radc** (int) – The chroma equivalent of *gradfun3*'s "mask" parameter
- **brz\_a** (float) – Binarizing thresh for the detail mask. Scaled to clip's depth if between 0 and 1 (inclusive), else assumed to be in native range. (Default: 0.025)
- **brz\_b** (float) – Binarizing thresh for the edge mask. Scaled to clip's depth if between 0 and 1 (inclusive), else assumed to be in native range. (Default: 0.045)

**Return type** VideoNode

**Returns** Detail mask

`lvsfunc.mask.halo_mask` (*clip*, *rad*=2, *brz*=0.35, *thmi*=0.315, *thma*=0.5, *thlimi*=0.195, *thlima*=0.392, *edgemask*=None)

A halo mask to catch basic haloing, inspired by the mask from FineDehalo. Most was copied from there, but some key adjustments were made to center it specifically around masking.

*rx* and *ry* are now combined into *rad* and expects an integer. Float made sense for FineDehalo since it uses DeHalo\_alpha for dehaloing, but the masks themselves use rounded *rx/ry* values, so there's no reason to bother with floats here.

All thresholds are float and will be scaled to *clip*'s format. If thresholds are greater than 1, they will be assumed to be in 8-bit and scaled accordingly.

#### Parameters

- **clip** (VideoNode) – Input clip
- **rad** (int) – Radius for the mask
- **brz** (float) – Binarizing for shrinking mask (Default: 0.35)
- **thmi** (float) – Minimum threshold for sharp edges; keep only the sharpest edges
- **thma** (float) – Maximum threshold for sharp edges; keep only the sharpest edges
- **thlimi** (float) – Minimum limiting threshold; includes more edges than previously, but ignores simple details
- **thlima** (float) – Maximum limiting threshold; includes more edges than previously, but ignores simple details
- **edgemask** (Optional[VideoNode]) – Edgemask to use. If None, uses `clip.std.Prewitt()` (Default: None).

**Return type** VideoNode

**Returns** Halo mask

`lvsfunc.mask.range_mask` (*clip*, *rad*=2, *radc*=0)

Min/max mask with separate luma/chroma radii.

*rad/radc* are the luma/chroma equivalent of *gradfun3*'s “mask” parameter. The way *gradfun3*'s mask works is on an 8 bit scale, with rounded dithering of high depth input. As such, when following this filter with a Binarize, use the following conversion steps based on input:

- 8 bit = Binarize(2) or Binarize(*thr\_det*)
- 16 bit = Binarize(384) or Binarize((*thr\_det* - 0.5) \* 256)
- floats = Binarize(0.005859375) or Binarize((*thr\_det* - 0.5) / 256)

When radii are equal to 1, this filter becomes identical to `mt_edge(“min/max”, 0, 255, 0, 255)`.

#### Parameters

- **clip** (VideoNode) – Input clip
- **rad** (int) – Depth in pixels of the detail/edge masking
- **radc** (int) – Chroma equivalent to *rad*

**Return type** VideoNode

**Returns** Range mask



## LVSFUNC.KERNELS

Kernels for vapoursynth internal resizers. Intended for use by *lvsfunc.scale* functions.

```
class lvsfunc.kernels.BSpline (**kwargs)
```

Bases: *lvsfunc.kernels.Bicubic*

```
class lvsfunc.kernels.Bicubic (b=0, c=0.5, **kwargs)
```

Bases: *lvsfunc.kernels.Kernel*

Built-in bicubic resizer.

Dependencies:

- VapourSynth-descale

### Parameters

- **b** (float) – B-param for bicubic kernel
- **c** (float) – C-param for bicubic kernel

```
descale (clip, width, height, shift=(0, 0))
```

**Return type** VideoNode

```
scale (clip, width, height, shift=(0, 0))
```

**Return type** VideoNode

```
class lvsfunc.kernels.BicubicSharp (**kwargs)
```

Bases: *lvsfunc.kernels.Bicubic*

```
class lvsfunc.kernels.Bilinear (**kwargs)
```

Bases: *lvsfunc.kernels.Kernel*

Built-in bilinear resizer.

```
descale (clip, width, height, shift=(0, 0))
```

**Return type** VideoNode

```
scale (clip, width, height, shift=(0, 0))
```

**Return type** VideoNode

```
class lvsfunc.kernels.Catrom (**kwargs)
```

Bases: *lvsfunc.kernels.Bicubic*

```
class lvsfunc.kernels.Hermite (**kwargs)
```

Bases: *lvsfunc.kernels.Bicubic*

```
class lvsfunc.kernels.Kernel (**kwargs)
    Bases: abc.ABC

    Abstract scaling kernel interface.

    Additional kwargs supplied to constructor are passed only to the internal resizer, not the descale resizer.

    abstract descale (clip, width, height, shift=(0, 0))

        Return type VideoNode

    abstract scale (clip, width, height, shift=(0, 0))

        Return type VideoNode

class lvsfunc.kernels.Lanczos (taps=4, **kwargs)
    Bases: lvsfunc.kernels.Kernel

    Built-in lanczos resizer.

    Dependencies:

    • VapourSynth-descale

    Parameters taps (int) – taps param for lanczos kernel

    descale (clip, width, height, shift=(0, 0))

        Return type VideoNode

    scale (clip, width, height, shift=(0, 0))

        Return type VideoNode

class lvsfunc.kernels.Mitchell (**kwargs)
    Bases: lvsfunc.kernels.Bicubic

class lvsfunc.kernels.Point (**kwargs)
    Bases: lvsfunc.kernels.Kernel

    Built-in point resizer.

    descale (clip, width, height, shift=(0, 0))

        Return type VideoNode

    scale (clip, width, height, shift=(0, 0))

        Return type VideoNode

class lvsfunc.kernels.Robidoux (**kwargs)
    Bases: lvsfunc.kernels.Bicubic

class lvsfunc.kernels.RobidouxSharp (**kwargs)
    Bases: lvsfunc.kernels.Bicubic

class lvsfunc.kernels.RobidouxSoft (**kwargs)
    Bases: lvsfunc.kernels.Bicubic

class lvsfunc.kernels.Spline16 (**kwargs)
    Bases: lvsfunc.kernels.Kernel

    Built-in spline16 resizer.

    Dependencies:

    • VapourSynth-descale
```



**descale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode

**scale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode

**class** lvfunc.kernels.**Spline36** (*\*\*kwargs*)

Bases: *lvfunc.kernels.Kernel*

Built-in spline36 resizer.

Dependencies:

- VapourSynth-descale

**descale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode

**scale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode

**class** lvfunc.kernels.**Spline64** (*\*\*kwargs*)

Bases: *lvfunc.kernels.Kernel*

Built-in spline64 resizer.

Dependencies:

- VapourSynth-descale

**descale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode

**scale** (*clip, width, height, shift=(0, 0)*)

**Return type** VideoNode



## LVSFUNC.MISC

|   |  |
|---|--|
| <code>lvfunc.misc.allow_variable([width, height, ...])</code> | Decorator allowing a variable-res and/or variable-format clip to be passed to a function that otherwise would not be able to accept it.                                      |
| <code>lvfunc.misc.chroma_injector(func)</code>                | Decorator allowing injection of reference chroma into a function which would normally only receive luma, such as an upscaler passed to <code>lvfunc.scale.descale()</code> . |
| <code>lvfunc.misc.colored_clips(amount[, ...])</code>         | Returns a list of BlankClips with unique colors in sequential or random order.   |
| <code>lvfunc.misc.edgefixer(clip[, left, right, ...])</code>  | A wrapper for ContinuityFixer ( <a href="https://github.com/MonoS/VS-ContinuityFixer">https://github.com/MonoS/VS-ContinuityFixer</a> ).                                     |
| <code>lvfunc.misc.frames_since_bookmark(clip, ...)</code>     | Displays frames since last bookmark to create easily reusable scenefiltering.  |
| <code>lvfunc.misc.get_matrix(clip)</code>                     | Helper function to get the matrix for a clip.  |
| <code>lvfunc.misc.limit_dark(clip, filtered[, ...])</code>    | Replaces frames in a clip with a filtered clip when the frame's darkness exceeds the threshold.  |
| <code>lvfunc.misc.load_bookmarks(bookmark_path)</code>        | VSEdit bookmark loader.  |
| <code>lvfunc.misc.shift_tint(clip[, values])</code>           | A function for forcibly adding pixel values to a clip.   |
| <code>lvfunc.misc.source(file[, ref, ...])</code>             | Generic clip import function.  |
| <code>lvfunc.misc.wipe_row(clip[, ref, pos, ...])</code>      | Simple function to wipe a row or column with a blank clip.   |

Miscellaneous functions and wrappers that didn't really have a place in any other submodules.

`lvfunc.misc.allow_variable` (*width=None, height=None, format=None*)

Decorator allowing a variable-res and/or variable-format clip to be passed to a function that otherwise would not be able to accept it. Implemented by FrameEvaluating and resizing the clip to each frame. Does not work when the function needs to return a different format unless an output format is specified. As such, this decorator must be called as a function when used (e.g. `@allow_variable()` or `@allow_variable(format=vs.GRAY16)`). If the provided clip is variable format, no output format is required to be specified.

### Parameters

- **width** (Optional[int]) – Output clip width
- **height** (Optional[int]) – Output clip height
- **format** (Optional[int]) – Output clip format

**Return type** Callable[[Callable[...VideoNode]], Callable[...VideoNode]]

**Returns** Function decorator for the given output format.

**lvfunc.misc.chroma\_injector** (*func*)

Decorator allowing injection of reference chroma into a function which would normally only receive luma, such as an upscaler passed to `lvfunc.scale.descale()`. The chroma is resampled to the input clip's width, height, and pixel format, shuffled to YUV444PX, then passed to the function. Luma is then extracted from the function result and returned. The first argument of the function is assumed to be the luma source. This works with variable resolution and may work with variable format, however the latter is wholly untested and likely a bad idea in every conceivable use case.

**Parameters** **func** (~F) – Function to call with injected chroma

**Return type** ~F

**Returns** Decorated function

**lvfunc.misc.colored\_clips** (*amount*, *max\_hue=300*, *rand=True*, *seed=None*, *\*\*kwargs*)

Returns a list of BlankClips with unique colors in sequential or random order. The colors will be evenly spaced by hue in the HSL colorspace.

Useful maybe for comparison functions or just for getting multiple uniquely colored BlankClips for testing purposes.

Will always return a pure red clip in the list as this is the RGB equivalent of the lowest HSL hue possible (0).

Written by Dave <[orangechannel@pm.me](mailto:orangechannel@pm.me)>.

**Parameters**

- **amount** (int) – Number of `vapoursynth.VideoNodes` to return
- **max\_hue** (int) – Maximum hue ( $0 < \text{hue} \leq 360$ ) in degrees to generate colors from (uses the HSL color model). Setting this higher than 315 will result in the clip colors looping back towards red and is not recommended for visually distinct colors. If the *amount* of clips is higher than the *max\_hue* expect there to be identical or visually similar colored clips returned (Default: 300)
- **rand** (bool) – Randomizes order of the returned list (Default: True)
- **seed** (Union[bytearray, bytes, float, int, str, None]) – Bytes-like object passed to `random.seed` which allows for consistent randomized order of the resulting clips (Default: None)
- **kwargs** (Any) – Arguments passed to `vapoursynth.core.std.BlankClip` (Default: `keep=1`)

**Return type** List[VideoNode]

**Returns** List of uniquely colored clips in sequential or random order.

**lvfunc.misc.edgfixer** (*clip*, *left=None*, *right=None*, *top=None*, *bottom=None*, *radius=None*, *full\_range=False*)

A wrapper for ContinuityFixer (<https://github.com/MonoS/VS-ContinuityFixer>).

Fixes the issues with over- and undershoot that it may create when fixing the edges, and adds what are in my opinion “more sane” ways of handling the parameters and given values.

... If possible, you should be using `bbmod` instead, though.

Alias for this function is `lvfunc.ef`.

Dependencies:

- VS-ContinuityFixer

**Parameters**

- **clip** (VideoNode) – Input clip
- **left** (Union[int, List[int], None]) – Number of pixels to fix on the left (Default: None)
- **right** (Union[int, List[int], None]) – Number of pixels to fix on the right (Default: None)
- **top** (Union[int, List[int], None]) – Number of pixels to fix on the top (Default: None)
- **bottom** (Union[int, List[int], None]) – Number of pixels to fix on the bottom (Default: None)
- **radius** (Optional[List[int]]) – Radius for edgefixing (Default: None)
- **full\_range** (bool) – Does not run the expression over the clip to fix over/undershoot (Default: False)

**Return type** VideoNode

**Returns** Clip with fixed edges

`lvfunc.misc.frames_since_bookmark(clip, bookmarks)`

Displays frames since last bookmark to create easily reusable scenefiltering. Can be used in tandem with `lvfunc.misc.load_bookmarks()` to import VSEdit bookmarks.

**Parameters**

- **clip** (VideoNode) – Input clip
- **bookmarks** (List[int]) – A list of bookmarks

**Return type** VideoNode

**Returns** Clip with bookmarked frames

`lvfunc.misc.get_matrix(clip)`

Helper function to get the matrix for a clip.

**Parameters** **clip** (VideoNode) – src clip

**Return type** int

**Returns** Value representing a matrix

`lvfunc.misc.limit_dark(clip, filtered, threshold=0.25, threshold_range=None)`

Replaces frames in a clip with a filtered clip when the frame's darkness exceeds the threshold. This way you can run lighter (or heavier) filtering on scenes that are almost entirely dark.

There is one caveat, however: You can get scenes where every other frame is filtered rather than the entire scene. Please do take care to avoid that if possible.

**Parameters**

- **clip** (VideoNode) – Input clip
- **filtered** (VideoNode) – Filtered clip
- **threshold** (float) – Threshold for frame averages to be filtered (Default: 0.25)
- **threshold\_range** (Optional[int]) – Threshold for a range of frame averages to be filtered (Default: None)

**Return type** VideoNode

**Returns** Conditionally filtered clip

`lvfunc.misc.load_bookmarks(bookmark_path)`

VSEdit bookmark loader.

`load_bookmarks(os.path.basename(__file__)+".bookmarks")` will load the VSEdit bookmarks for the current Vapoursynth script.

**Parameters** `bookmark_path` (`str`) – Path to bookmarks file

**Return type** `List[int]`

**Returns** A list of bookmarked frames

`lvfunc.misc.shift_tint(clip, values=16)`

A function for forcibly adding pixel values to a clip. Can be used to fix green tints in Crunchyroll sources, for example. Only use this if you know what you're doing!

This function accepts a single integer or a list of integers. Values passed should mimic those of an 8bit clip. If your clip is not 8bit, they will be scaled accordingly.

If you only pass 1 value, it will be copied to every plane. If you pass 2, the 2nd one will be copied over to the 3rd. Don't pass more than three.

**Parameters**

- **clip** (`VideoNode`) – Input clip
- **values** (`Union[int, Sequence[int]]`) – Value added to every pixel, scales accordingly to your clip's depth (Default: 16)

**Return type** `VideoNode`

**Returns** Clip with pixel values added

`lvfunc.misc.source(file, ref=None, force_lsmas=False, mpls=False, mpls_playlist=0, mpls_angle=0, **index_args)`

Generic clip import function. Automatically determines if ffms2 or L-SMASH should be used to import a clip, but L-SMASH can be forced. It also automatically determines if an image has been imported. You can set its fps using 'fpsnum' and 'fpsden', or using a reference clip with 'ref'.

Alias for this function is *lvfunc.src*.

Dependencies:

- ffms2
- L-SMASH-Works (optional: m2ts sources or when forcing lsmas)
- d2vsource (optional: d2v sources)
- dgdecodenv (optional: dgi sources)
- VapourSynth-ReadMpls (optional: mpls sources)

**Parameters**

- **file** (`str`) – Input file
- **ref** (`Optional[VideoNode]`) – Use another clip as reference for the clip's format, resolution, and framerate (Default: None)
- **force\_lsmas** (`bool`) – Force files to be imported with L-SMASH (Default: False)
- **mpls** (`bool`) – Load in a mpls file (Default: False)
- **mpls\_playlist** (`int`) – Playlist number, which is the number in mpls file name (Default: 0)

- **mpls\_angle** (int) – Angle number to select in the mpls playlist (Default: 0)
- **kwargs** – Arguments passed to the indexing filter

**Return type** VideoNode

**Returns** Vapoursynth clip representing input file

`lvsfunc.misc.wipe_row (clip, ref=None, pos=(1, 1), size=None, show_mask=False)`

Simple function to wipe a row or column with a blank clip. You can also give it a different clip to replace a row with.

**Parameters**

- **clip** (VideoNode) – Input clip
- **secondary** – Clip to replace wiped rows with (Default: None)
- **width** – Width of row (Default: 1)
- **height** – Height of row (Default: 1)
- **offset\_x** – X-offset of row (Default: 0)
- **offset\_y** – Y-offset of row (Default: 0)

**Return type** VideoNode

**Returns** Clip with given rows or columns wiped





## LVSFUNC.RECON

---

|  |   |
|--|---|
| <code>lvsfunc.recon.chroma_reconstruct(clip[, ...])</code> | A function to demangle messed-up chroma, like for example chroma that was downsampled using Nearest Neighbour, or the chroma found on DVDs. |
|--|---|

---

Wrappers and functions for chroma reconstruction. Original functions written by shane on Discord, but since he doesn't seem to be releasing them, I will be the one to do it.

`lvsfunc.recon.ChromaReconstruct (clip, radius=2, i444=False)`

A function to demangle messed-up chroma, like for example chroma that was downsampled using Nearest Neighbour, or the chroma found on DVDs. This function should be used with care, and not blindly applied to anything.

This function can also return a 4:4:4 clip. This is not recommended except for very specific cases, like for example where you're dealing with a razor-sharp 1080p source with a lot of bright colours. Otherwise, have it return the 4:2:0 clip instead.

Original function by shane, modified by Ichunjo and LightArrowsEXE.

Aliases for this function are `lvsfunc.demangle` and `lvsfunc.crecon`.

### Parameters

- **clip** (VideoNode) – Input clip
- **radius** (int) – Boxblur radius
- **i444** (bool) – Return a 4:4:4 clip

**Return type** VideoNode

**Returns** Clip with demangled chroma in either 4:2:0 or 4:4:4

**class** `lvsfunc.recon.RegressClips (slope, intercept, correlation)`

Bases: tuple

**correlation:** `vapoursynth.VideoNode`

Alias for field number 2

**intercept:** `vapoursynth.VideoNode`

Alias for field number 1

**slope:** `vapoursynth.VideoNode`

Alias for field number 0

`lvsfunc.recon.chroma_reconstruct (clip, radius=2, i444=False)`

A function to demangle messed-up chroma, like for example chroma that was downsampled using Nearest Neighbour, or the chroma found on DVDs. This function should be used with care, and not blindly applied to anything.

This function can also return a 4:4:4 clip. This is not recommended except for very specific cases, like for example where you're dealing with a razor-sharp 1080p source with a lot of bright colours. Otherwise, have it return the 4:2:0 clip instead.

Original function by shane, modified by Ichunjo and LightArrowsEXE.

Aliases for this function are *lvsvfunc.demangle* and *lvsvfunc.crecon*.

**Parameters**

- **clip** (VideoNode) – Input clip
- **radius** (int) – Boxblur radius
- **i444** (bool) – Return a 4:4:4 clip

**Return type** VideoNode

**Returns** Clip with demangled chroma in either 4:2:0 or 4:4:4

## LVSFUNC.RENDER

---

|  |  |
|--|--|
| <code>lvsfunc.render.clip_async_render(clip[, ...])</code>   | Render a clip by requesting frames asynchronously using <code>clip.get_frame_async</code> , providing for callback with frame number and frame object. |
| <code>lvsfunc.render.find_scene_changes(clip[, mode])</code> | Generate a list of scene changes (keyframes).  |

---

Clip rendering helpers.

```
class lvsfunc.render.RenderContext(clip, queued)
```

Bases: object

Contains info on the current render operation.

**clip:** vapoursynth.VideoNode

**condition:** threading.Condition

**frames:** Dict[int, vapoursynth.VideoFrame]

**frames\_rendered:** int

**queued:** int

**timecodes:** List[float]

```
class lvsfunc.render.SceneChangeMode(value)
```

Bases: enum.Enum

An enumeration.

**SCXVID = 1**

**WWXD = 0**

**WWXD\_SCXVID\_INTERSECTION = 3**

**WWXD\_SCXVID\_UNION = 2**

```
lvsfunc.render.clip_async_render(clip, outfile=None, timecodes=None, progress='Rendering clip...', callback=None)
```

Render a clip by requesting frames asynchronously using `clip.get_frame_async`, providing for callback with frame number and frame object.

This is mostly a re-implementation of `VideoNode.output`, but a little bit slower since it's pure python. You only really need this when you want to render a clip while operating on each frame in order or you want timecodes without using `vspipe`.

### Parameters

- **clip** (VideoNode) – Clip to render.
- **outfile** (Optional[BinaryIO]) – Y4MPEG render output BinaryIO handle. If None, no Y4M output is performed. Use `sys.stdout.buffer` for stdout. (Default: None)
- **timecodes** (Optional[TextIO]) – Timecode v2 file TextIO handle. If None, timecodes will not be written.
- **progress** (Optional[str]) – String to use for render progress display. If empty or None, no progress display.
- **callback** (Union[Callable[[int, VideoFrame], None], List[Callable[[int, VideoFrame], None]], None) – Single or list of callbacks to be preformed. The callbacks are called when each sequential frame is output, not when each frame is done. Must have signature `Callable[[int, vs.VideoNode], None]` See [lvsfunc.comparison.diff\(\)](#) for a use case (Default: None).

**Return type** List[float]

**Returns** List of timecodes from rendered clip.

`lvsfunc.render.find_scene_changes` (*clip*, *mode*=<SceneChangeMode.WWXD: 0>)  
Generate a list of scene changes (keyframes).

Dependencies:

- vapoursynth-wwxd
- vapoursynth-scxvid (Optional: scxvid mode)

#### Parameters

- **clip** (VideoNode) – Clip to search for scene changes. Will be rendered in its entirety.
- **mode** (*SceneChangeMode*) – Scene change detection mode:
  - WWXD: Use wwxd
  - SCXVID: Use scxvid
  - WWXD\_SCXVID\_UNION: Union of wwxd and scxvid (must be detected by at least one)
  - WWXD\_SCXVID\_INTERSECTION: Intersection of wwxd and scxvid (must be detected by both)

**Return type** List[int]

**Returns** List of scene changes.

`lvsfunc.render.finish_frame` (*outfile*, *timecodes*, *ctx*)  
Output a frame.

#### Parameters

- **outfile** (Optional[BinaryIO]) – Output IO handle for Y4MPEG
- **timecodes** (Optional[TextIO]) – Output IO handle for timecodesv2
- **ctx** (*RenderContext*) – Rendering context

**Return type** None

`lvsfunc.render.get_render_progress` ()

**Return type** Progress

## LVSFUNC.SCALE

|   |  |
|---|--|
| <code>lvsfunc.scale.descale(clip[, upscaler, ...])</code>   | A unified descaling function.  |
| <code>lvsfunc.scale.descale_detail_mask</code>              | Generate a detail mask given a clip and a clip rescaled with the same kernel.  |
| <code>lvsfunc.scale.reupscale</code>                        | A quick 'n easy wrapper used to re-upscale a clip descaled with descale using znedi3.                                  |
| <code>lvsfunc.scale.test_descale(clip[, width, ...])</code> | Generic function to test descales with; descales and re-upscales a given clip, allowing you to compare the two easily. |

**class** `lvsfunc.scale.Resolution` (*width: int, height: int*)

Bases: tuple

Tuple representing a resolution.

**width: int**

Width.

**height: int**

Height.

**class** `lvsfunc.scale.ScaleAttempt` (*descaled: vapoursynth.VideoNode, rescaled: vapoursynth.VideoNode, resolution: lvsfunc.scale.Resolution, diff: vapoursynth.VideoNode*)

Bases: tuple

Tuple representing a descale attempt.

**descaled: vapoursynth.VideoNode**

Descaled frame in native resolution.

**rescaled: vapoursynth.VideoNode**

Descaled frame reupscaled with the same kernel.

**resolution: lvsfunc.scale.Resolution**

The native resolution.

**diff: vapoursynth.VideoNode**

The subtractive difference between the original and descaled frame.

Functions for (de)scaling.

`lvsfunc.scale.descale` (*clip, upscaler=<function reupscale>, width=None, height=720, kernel=<lvsfunc.kernels.Bicubic object>, threshold=0.0, mask=<function descale\_detail\_mask>, src\_left=0.0, src\_top=0.0, show\_mask=False*)

A unified descaling function. Includes support for handling fractional resolutions (experimental), multiple resolutions, detail masking, and conditional scaling.

If you want to descale to a fractional resolution, set `src_left` and `src_top` and round up the target height.

If the source has multiple native resolutions, specify `height` as a list.

If you want to conditionally descale, specify a non-zero threshold.

Dependencies:

- vapoursynth-descale
- znedi3

### Parameters

- **clip** (`VideoNode`) – Clip to descale
- **upscaler** (`Optional[Callable[[VideoNode, int, int], VideoNode]]`) – Callable function with signature `upscaler(clip, width, height) -> vs.VideoNode` to be used for reupsaling. Must be capable of handling variable res clips for multiple heights and conditional scaling. If a single height is given and upscaler is `None`, a constant resolution GRAY clip will be returned instead. Note that if upscaler is `None`, no upscaling will be performed and neither detail masking nor proper fractional descaling can be preformed. (Default: `lvfunc.scale.reupscale()`)
- **width** (`Union[int, List[int], None]`) – Width to descale to (if `None`, auto-calculated)
- **height** (`Union[int, List[int]]`) – Height(s) to descale to. List indicates multiple resolutions, the function will determine the best. (Default: 720)
- **kernel** (`Kernel`) – Kernel used to descale (see `lvfunc.kernels.Kernel`, (Default: `kernels.Bicubic(b=0, c=1/2)`)
- **threshold** (`float`) – Error threshold for conditional descaling (Default: 0.0, always descale)
- **mask** (`Optional[Callable[[VideoNode, VideoNode], VideoNode]]`) – Function used to mask detail. If `None`, no masking. Function must accept a clip and a reupscaled clip and return a mask. (Default: `lvfunc.scale.descale_detail_mask()`)
- **src\_left** (`float`) – Horizontal shifting for fractional resolutions (Default: 0.0)
- **src\_top** (`float`) – Vertical shifting for fractional resolutions (Default: 0.0)
- **show\_mask** (`bool`) – Return detail mask

**Return type** `VideoNode`

**Returns** Descaled and re-upscaled clip with float bitdepth

### `lvfunc.scale.descale_detail_mask`

Generate a detail mask given a clip and a clip rescaled with the same kernel.

Function is curried to allow parameter tuning when passing to `lvfunc.scale.descale()`

### Parameters

- **clip** – Original clip
- **rescaled\_clip** – Clip downscaled and reupscaled using the same kernel
- **threshold** – Binarization threshold for mask (Default: 0.05)

**Returns** Mask of lost detail

**lvfunc.scale.reupscale**

A quick 'n easy wrapper used to re-upscale a clip descaled with descale using znedi3.

Function is curried to allow parameter tuning when passing to `lvfunc.scale.descale()`

Stolen from Varde with some adjustments made.

Dependencies:

- znedi3

**Parameters**

- **clip** – Input clip
- **width** – Upscale width. If None, determine from *height* assuming 16:9 aspect ratio (Default: None)
- **height** – Upscale height (Default: 1080)
- **kernel** – Kernel used to downscale the doubled clip (see `lvfunc.kernels.Kernel`, Default: `kernels.Bicubic(b=0, c=1/2)`)
- **kwargs** – Arguments passed to znedi3 (Default: `nsize=4, nns=4, qual=2, pscrn=2`)

**Returns** Reupscaled clip

`lvfunc.scale.test_descale(clip, width=None, height=720, kernel=<lvfunc.kernels.Bicubic object>, show_error=True)`

Generic function to test descales with; descales and reupscales a given clip, allowing you to compare the two easily. Also returns a `lvfunc.scale.ScaleAttempt` with additional information.

When comparing, it is recommended to do atleast a 4x zoom using Nearest Neighbor. I also suggest using 'compare' (`lvfunc.comparison.compare()`), as that will make comparing the output with the source clip a lot easier.

Some of this code was leveraged from DescaleAA found in fvsfunc.

Dependencies:

- vapoursynth-descale

**Parameters**

- **clip** (VideoNode) – Input clip
- **width** (Optional[int]) – Target descale width. If None, determine from *height*
- **height** (int) – Target descale height (Default: 720)
- **kernel** (`Kernel`) – Kernel used to descale (see `lvfunc.kernels.Kernel`, Default: `kernels.Bicubic(b=0, c=1/2)`)
- **show\_error** (bool) – Render PlaneStatsDiff on the reupscaled frame (Default: True)

**Return type** Tuple[VideoNode, `ScaleAttempt`]

**Returns** A tuple containing a clip re-upscaled with the same kernel and a ScaleAttempt tuple.





## LVSFUNC.TYPES

```
class lvsfunc.types.Coordinate(x,y)
    Bases: object
    A positive set of (x, y) coordinates.
    x: int
    y: int
class lvsfunc.types.Matrix(value)
    Bases: enum.IntEnum
    Matrix coefficients (ITU-T H.265 Table E.5)
    BT2020C = 10
    BT2020NC = 9
    BT470BG = 5
    BT709 = 1
    CHROMA_DERIVED_C = 13
    CHROMA_DERIVED_NC = 12
    FCC = 4
    GBR = 0
    ICTCP = 14
    property RESERVED
        Return type NoReturn
    RGB = 0
    SMPTE170M = 6
    SMPTE2085 = 11
    SMPTE240M = 7
    UNKNOWN = 2
    YCGCO = 8
class lvsfunc.types.Position(x,y)
    Bases: lvsfunc.types.Coordinate
    x: int
```

```
    y:  int
class lvfunc.types.Size(x,y)
    Bases: lvfunc.types.Coordinate
    x:  int
    y:  int
```

## LVSFUNC.UTIL

|  |  |
|--|--|
| <code>lvsfunc.util.get_prop(frame, key, t)</code>              | Gets FrameProp prop from frame <code>frame</code> with expected type <code>t</code> to satisfy the type checker. |
| <code>lvsfunc.util.normalize_ranges(clip, ranges)</code>       | Normalize Range(s) to a list of inclusive positive integer ranges.   |
| <code>lvsfunc.util.pick_removegrain(clip)</code>               | Returns <code>rgvs.RemoveGrain</code> if the clip is 16 bit or lower, else <code>rgsf.RemoveGrain</code> .       |
| <code>lvsfunc.util.pick_repair(clip)</code>                    | Returns <code>rgvs.Repair</code> if the clip is 16 bit or lower, else <code>rgsf.Repair</code> .                 |
| <code>lvsfunc.util.quick_resample(clip, function)</code>       | A function to quickly resample to 16/8 bit and back to the original depth.                                       |
| <code>lvsfunc.util.replace_ranges(clip_a, clip_b, ...)</code>  | A replacement for <code>ReplaceFramesSimple</code> that uses ints and tuples rather than a string.               |
| <code>lvsfunc.util.scale_thresh(thresh, clip[, assume])</code> | Scale binarization thresholds from float to int.   |

Helper functions for the main functions in the script.

`lvsfunc.util.get_prop(frame, key, t)`

Gets FrameProp prop from frame `frame` with expected type `t` to satisfy the type checker.

**Parameters**

- **frame** (VideoFrame) – Frame containing props
- **key** (str) – Prop to get
- **t** (Type[~T]) – Type of prop

**Return type** ~T

**Returns** `frame.prop[key]`

`lvsfunc.util.normalize_ranges(clip, ranges)`

Normalize Range(s) to a list of inclusive positive integer ranges.

**Parameters**

- **clip** (VideoNode) – Reference clip used for length.
- **ranges** (Union[int, None, Tuple[Optional[int], Optional[int]], List[Union[int, None, Tuple[Optional[int], Optional[int]]]]) – Single Range or list of Ranges.

**Return type** List[Tuple[int, int]]

**Returns** List of inclusive positive ranges.

`lvsfunc.util.pick_removegrain(clip)`

Returns `rgvs.RemoveGrain` if the clip is 16 bit or lower, else `rgsf.RemoveGrain`. This is done because `rgvs` doesn't work with float, but `rgsf` does for whatever reason.

Dependencies:

- `RGSF`

**Parameters** `clip` (`VideoNode`) – Input clip

**Return type** `Callable[..., VideoNode]`

**Returns** Appropriate `RemoveGrain` function for input clip's depth

`lvsfunc.util.pick_repair(clip)`

Returns `rgvs.Repair` if the clip is 16 bit or lower, else `rgsf.Repair`. This is done because `rgvs` doesn't work with float, but `rgsf` does for whatever reason.

Dependencies: `rgsf`

**Parameters** `clip` (`VideoNode`) – Input clip

**Return type** `Callable[..., VideoNode]`

**Returns** Appropriate repair function for input clip's depth

`lvsfunc.util.quick_resample(clip, function)`

A function to quickly resample to 16/8 bit and back to the original depth. Useful for filters that only work in 16 bit or lower when you're working in float.

**Parameters**

- `clip` (`VideoNode`) – Input clip
- `function` (`Callable[[VideoNode], VideoNode]`) – Filter to run after resampling (accepts and returns clip)

**Return type** `VideoNode`

**Returns** Filtered clip in original depth

`lvsfunc.util.replace_ranges(clip_a, clip_b, ranges)`

A replacement for `ReplaceFramesSimple` that uses ints and tuples rather than a string. Frame ranges are inclusive.

Examples with clips `black` and `white` of equal length:

- `replace_ranges(black, white, [(0, 1)])`: replace frames 0 and 1 with white
- `replace_ranges(black, white, [(None, None)])`: replace the entire clip with white
- `replace_ranges(black, white, [(0, None)])`: same as previous
- `replace_ranges(black, white, [(200, None)])`: replace 200 until the end with white
- `replace_ranges(black, white, [(200, -1)])`: replace 200 until the end with white, leaving 1 frame of black

**Parameters**

- `clip_a` (`VideoNode`) – Original clip
- `clip_b` (`VideoNode`) – Replacement clip

- **ranges** (Union[int, None, Tuple[Optional[int], Optional[int]], List[Union[int, None, Tuple[Optional[int], Optional[int]]]]) – Ranges to replace clip\_a (original clip) with clip\_b (replacement clip).

Integer values in the list indicate single frames,

Tuple values indicate inclusive ranges.

Negative integer values will be wrapped around based on clip\_b's length.

None values are context dependent:

- None provided as sole value to ranges: no-op
- Single None value in list: Last frame in clip\_b
- None as first value of tuple: 0
- None as second value of tuple: Last frame in clip\_b

**Return type** VideoNode

**Returns** Clip with ranges from clip\_a replaced with clip\_b

lvfunc.util.**scale\_thresh** (thresh, clip, assume=None)

Scale binarization thresholds from float to int.

**Parameters**

- **thresh** (float) – Threshold [0, 1]. If greater than 1, assumed to be in native clip range
- **clip** (VideoNode) – Clip to scale to
- **assume** (Optional[int]) – Assume input is this depth when given input >1. If None, assume clip's format. (Default: None)

**Return type** float

**Returns** Threshold scaled to [0, 2<sup>clip.depth</sup> - 1] (if vs.INTEGER)



## **SPECIAL CREDITS**

A special thanks to every contributor that contributed to lvsfunc.

The list of contributors can be found [here](#).





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