

# Windowing, a PlugIn for "ImageJ"

Version 3.0.x Bureau H. Glünder 2019 / 2020

## WHAT FOR

**Windowing** is an "ImageJ"-PlugIn that is "Macro"-recordable.

**Windowing** returns a soft-windowed 32bit version of a square-sized image, or of a circular or square-sized selection of an image.

**Windowing** optionally reduces or minimizes the image mean and zero-pads the image to the next "power of two"-size.

**Windowing** does not accept RGB-color images or image-stacks.

## INSTALL

Download "Windowing\_3-0-x.zip" and unzip it.

Launch "ImageJ" or "Fiji" and install the file **Windowing.class** per menu item "Plugins ▷ Install..." or move it to the "plugins"-folder of your "ImageJ"-installation.

Quit and re-launch "ImageJ".

## HOW TO

Open an image that must either be square-sized or have a square-sized or circular selection.

According to the selection type, the applied window function will either be square- or disc-shaped.

Without selection, a disc-shaped window is applied to the whole image.

Choose the item "Windowing" from the "Plugins"-menu of "ImageJ".

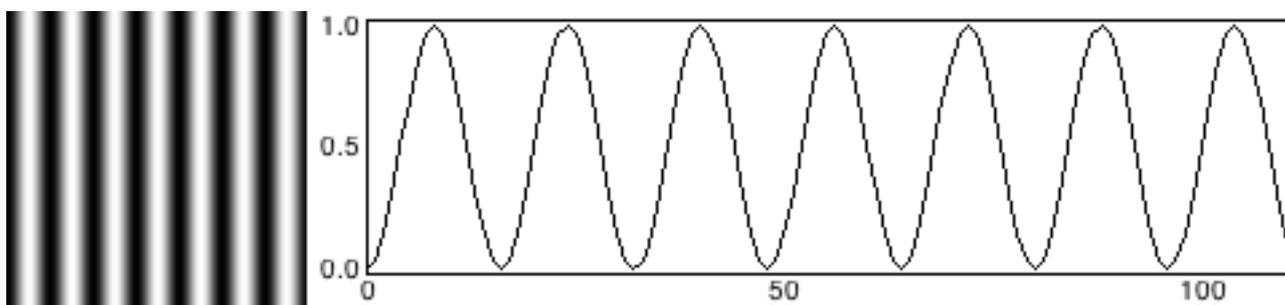
The dialog:

- Set the "Percentage Flat"-weighting for the window function.
- Select the desired treatment of the mean value.
- Two options if the side-length of the augmented\* image or selection is not a power of two:
  - Check "Embed..." to embed the windowed image a canvas with next "power of two" side-length.
  - Check "Add..." to add the previously removed mean value to the embedded image.
- Check "Display Window Function" does what it says.
- The canvas size can be increased by a "power of two"-factor.
- Click "OK" to obtain the processed image in 32bit format.

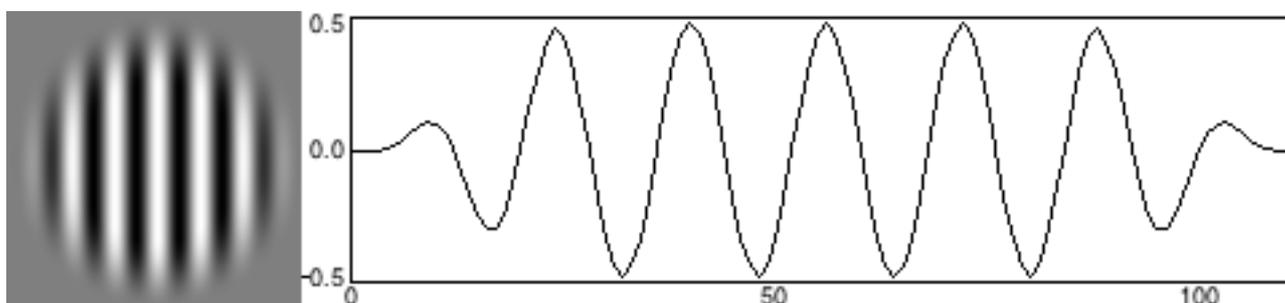
Details:

- Size and shape of the window function follow that of the selection. Images or selections of odd side-lengths or diameters are enlarged by one pixel.
- The window function is of the "Tukey"-type, i.e. it shows a flat center and raised-cosine slopes down to zero. Setting the percentage flat to zero results in the "von Hann"-window, setting it to 100% results in a hard-limiting window.
- The mean value of the image inside the window shape can either
  - (a) remain unchanged ("Keep"),
  - (b) be subtracted before the windowing ("Reduce"), or
  - (c) be minimized without changing the shape of the windowed image ("Minimize").If the mean is subtracted (b), the subsequent windowing necessarily introduces a small mean value (caused by spectral convolution) that can be minimized without changing the shape of the window function (c) (total reduction factors are typically better than  $10^8$ ).

Example:



With "50% flat" and "Mean Value: Reduce":



Results				
	Label	Mean	Min	Max
1	CosineGrating.tif	0.500	0	1
2	CosineGrating_TukeyDisc50flat	9.143E-4	-0.498	0.502

#### Macro operation:

- `prcntFlat = 50; meanTreat = "Reduce"; twoExp = 1; // example values`  
`run( "Windowing ", "percentage_flat=[prcntFlat] mean=[meanTreat] embed add display`  
`factor_2^=[twoExp] " );`
- For boolean "unchecking" simply remove the corresponding keyword.

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