ENSO 2013 Derivative Filter

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Derivative Filter

http://reference.wolfram.com/language/ref/DerivativeFilter.html

DerivativeFilter is a linear filter that renders the derivatives of an image based on a spline interpolation model.

DerivativeFilter uses the array coordinate system, where the first coordinate runs from the top to the bottom of image, and the second coordinate increases from right to left.

The vertical derivative of an image:



The horizontal derivative of an image:



Slicer $\partial_t \partial_x$

These patterns were first observed by Daniel Mahler, and we were asked to investigate if they are artefacts or actual patterns to the ENSO grid data.

In order to avoid taking averages for 2D projection of the data, the 3D Derivative Filter was used to live the dimensionality of the grid data intact.

Note: x is the horizontal axis.



Upon rotation and slicing it is obvoius that these patterns are fixed and not artefacts of transformations.

Perhaps we are seeing a standing wave.



Slicer $\partial_t \partial_y$

Note: y is the horizontal axis.

Clearly moving waves.



