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Subject: Re: 3d Hanning filter

Posted by [K. Bowman](#) on Thu, 10 Jun 2004 13:50:28 GMT

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In article <ca9i36\$e1d\$1@pegasus.csx.cam.ac.uk>,

"Tim" <tjvy2@cam.ac.uk> wrote:

> Dear all,

>

> I want to produce a Hanning filter in 3d, and can do so using 3 for loops.

> This is fine for small arrays, but uses too much memory and time, otherwise.

> I've tried hacking hanning.pro, but can't get it to work.

Have you considered doing your filtering in the spectral domain?

Convolution in the physical domain is equivalent to multiplication in the spectral domain; so, following the convolution theorem, the filtering operation can be written

$$z_{\text{filtered}} = \text{FFT}(\text{FFT}(\text{filter}) * \text{FFT}(z), /\text{INVERSE})$$

Filter is an array that's the same size as z. If z is real, you want to take the FLOAT of the result.

As with all FFT methods, this works fastest if the dimensions of z have small prime factors.

Ken Bowman

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