Subject: Re: Wiener filter
Posted by Richard Tyc on Wed, 19 Dec 2001 20:10:29 GMT
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> Optimal Wiener filtering of a one-dimensional data set is described in
> section 12.6 of "Numerical Recipes in C", by Preuss et.al. It cites
> three books on signal processing as references. The basic result is that
> if you have a corrupted signal with the fourier spectrum S(f),
> containing noise with a fourier specturm N(f), it can be shown
> rigorously that the optimal (in the sense of a least-squares fit)
> frequency filter for removing the noise is:
>
> |S(f)|^2
> phi(f) = ----------
> |S(f)|^2 + |N(f)|^2
>

What exactly is |S(f)|^2

If I have a 2D corrupted image, say I(x,y)

Is it ABS(FFT(I)) ^ 2 or the magnitude of the complex FFT result squared (Power Spectrum) squared ?

> The procedure is straightforward. Estimate the fourier spectrum of the
> noise. Calculate the fourier spectrum of the corrupted signal. Calculate
> the corresponding filter function. Multiply the fourier spectrum of the
> corrupted signal by the filter function. Do an inverse fourier transform
> on the resulting function, to get an optimum estimate to the uncorrupted
> signal.

It seems some knowledge of the noise is required. What if it was modeled as 'white noise' where it would be constant at all spatial frequencies.

A paper I am using that discusses this in the context of my problem points out, "....Assuming that noise power spectrum is white, the mean spectral density at high spatial frequencies was calculated and subtracted from P(f) (the power spectral density of the corrupted image) to estimate S(f) (power spectral density of uncorrupted image). Can you shed any light on this in terms of IDL code ??

Thanks for the help
Rich