Subject: Re: Phase Delay and Group Delay
Posted by hancock on Fri, 09 Aug 2002 15:45:14 GMT
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You are absolutely right, I always get the sign of phase shifts mixed up.Regarding your second question, the simple answer is no, the pedantic answer is in a very hypothetical circumstance, it might be possible. If the filter is an analog filter, then the answer is easy: in theory it takes forever for the signal to work its way through the filter unless it's a simple gain.For digital filters it's a little more difficult. There are two basic types of digital filters, Infinite Impulse Response (IIR) and Finite Impulse Response (FIR) filters. As the name suggests, it takes an infinite amount of time for a signal to work it's way through an IIR filter. The time it takes for a signal to work its way through an FIR filter is equal to the order of the filter.In engineer speak, IIR filters have at least one pole and can have many zeros. FIR filters have only zeros. Your question then amounts to "is knowing phase without knowing magnitude enough to a) know whether or not the filter has any poles and b) know the number of zeros in the filter?"If all you have is the phase from a Discrete Fourier Transform (DFT) calculated from a finite impulse response measurement, then the answer is no you can't tell the number of poles and zeros simply because it would take an infinitely long impulse response to do so and you don't have an infinite amount of time to make take that sample.On the other hand, if you know the phase from a Fourier transform of the filter transfer function, it may actually be possible to at least tell if it is an IIR filter or not. I don't have an immediate answer to that question. This is, of course, a hypothetical question, because if you know the transfer function of the filter, then you know how many poles and zeros it has.I hope that helps more than it confuses, but am pretty sure it won't...John