Multimedia Signal Processing 1st Module

21 /9/2010

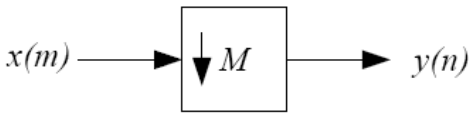
Ex.1 (Pt.12)

The *z* transform of a filter H(z) is the following: $H(z)=\frac{1+z^{-5}}{1+z^{-1}}$

1. Draw the zeros-poles diagram.
2. Define the Impulse response, *h*(*n*) of the filter, what can we say concerning its length?
3. Define the power of the resulting filter H(z).
4. Define the **amplitude** and **phase** response of the filter H(z) for the 3 normalized frequencies: 0, $2\pi/5$, π
5. Define the block diagram for the filter implementation.

Ex.2 (Pt.7)

Describe the downsampling of an order of 3 of a signal: (where M=3).



1. If the original signal spectrum extends from $-\pi/2$ to $\pi/2$ (in normalized frequencies) draw the final spectrum after downsampling (quoting both axes).
2. How can be avoided aliasing? Describe the optimal decimation chain for this case.

Ex.3 (Pt.8)

The first 8 samples of a signal are: 3,-2,2,1,0,-4,-2,1
Define the optimal parameters for an AutoRegressive model (order 2) and the power of a white noise source (σ_w^2) for the spectral estimation of the signal.

Ex. 4 (Pt.4)

Discuss the Hanning Window and its properties, advantages and drawbacks with respect to other windows seen in the course.