

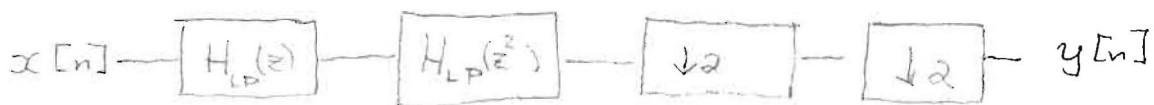
ECE - 539, SPRING 2012
DIGITAL SIGNAL PROCESSING

EXAMPLE: APPLICATION OF
NOBLE IDENTITIES

Consider a two-time cascade of
decimation section by a factor of $M=2$



Applying the first identity to the intermediate
block we have:



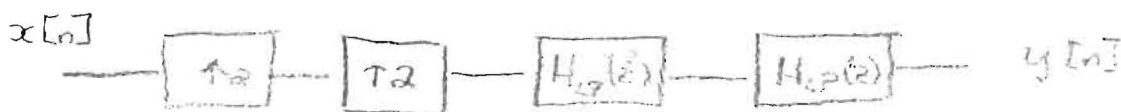
Combining the two systems and the downsamplers



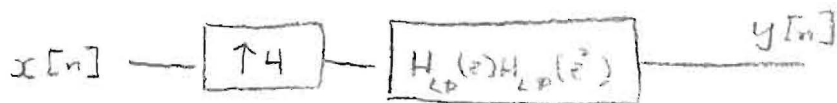
Similarly consider a two-time cascade of interpolation sections by a factor of $L=2$



Applying the second identity to middle block:



Combining the interpolators and filters we have



These results are used in pyramidal structured filterbanks in the context of wavelet coding