Homework 7

Due: 20/04/2015

Upload to the moodle

- Design an 11 order zero phase half-band filter whose passband and stopband are odd-symmetric around $w = \frac{\pi}{2}$ using the FFT based filter design algorithm (in the article Equiripple FIR Filter Design by the FFT Algorithm). The desired frequency response of the filter is given as follows (choose both tolerance parameters as 0.05):

$$H_{id}(e^{j\omega}) = \begin{cases} 1, & 0 \leq \omega \leq 0.4\,\pi \\ 0, & 0.6\,\pi \leq \omega \leq \pi \end{cases}$$

- The results should be very similar to Table 1A in the article. Filter the shirt.jpg row by row using the filter that you obtained. Comment on the results.

- Design a 1D highpass filter based on the lowpass filter you designed above. Filter the shirt.jpg row by row using the filter that you obtained. Comment on the results.