# DSP1 Final Exam question 1: Lowpass Filtering a Noisy ECG Signal

FIR filter:

Type - lowpass

Order- 30

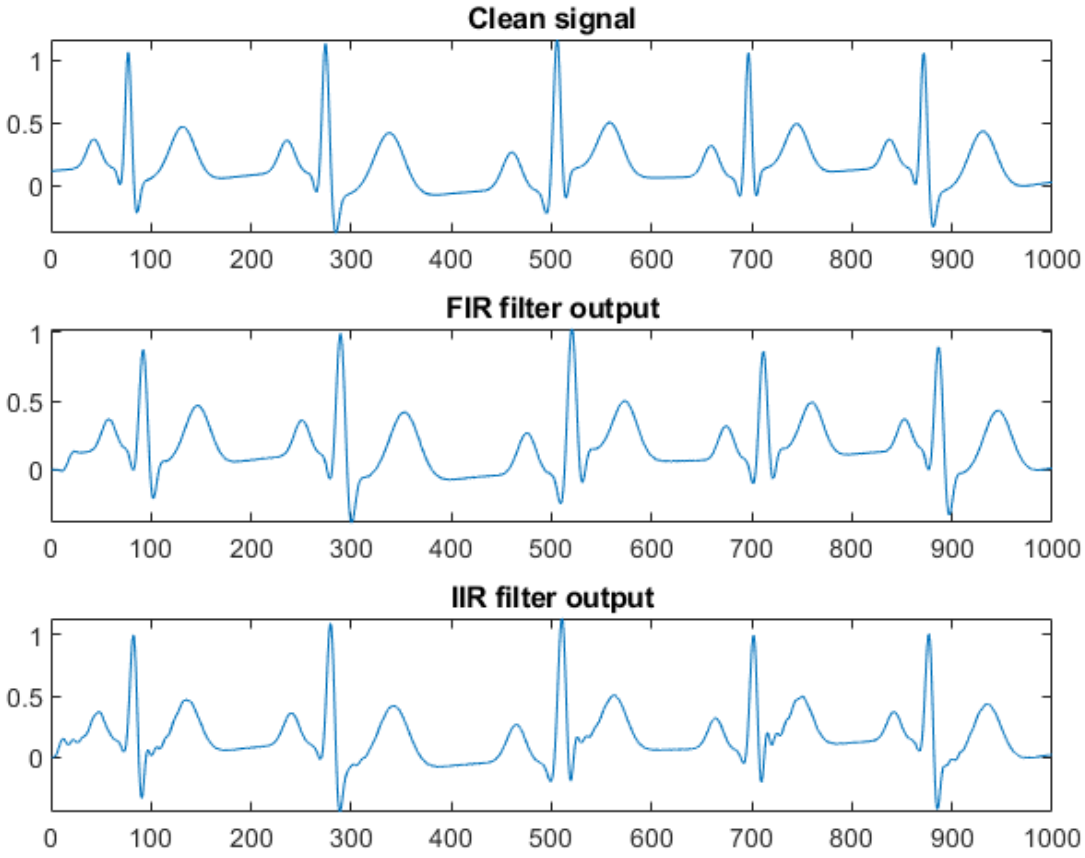
FIR filter is designed using 'firls' function in MATALB. Passband, stopband weight functions, order of filter and cut-off frequency is adjusted until good balance between removing noise and preserving ECG data is achieved.

IIR filter:

Type – Chebyshev type 2, lowpass

Order- 10

For IIR filter Chebyshev type 2 filter is chosen because it has no ripples in passband and relatively small transition width. Butterworth filter has no ripples in pass as well as stop band but its transition width is large. Elliptic and Chebyshev type 1 has ripples in passband.



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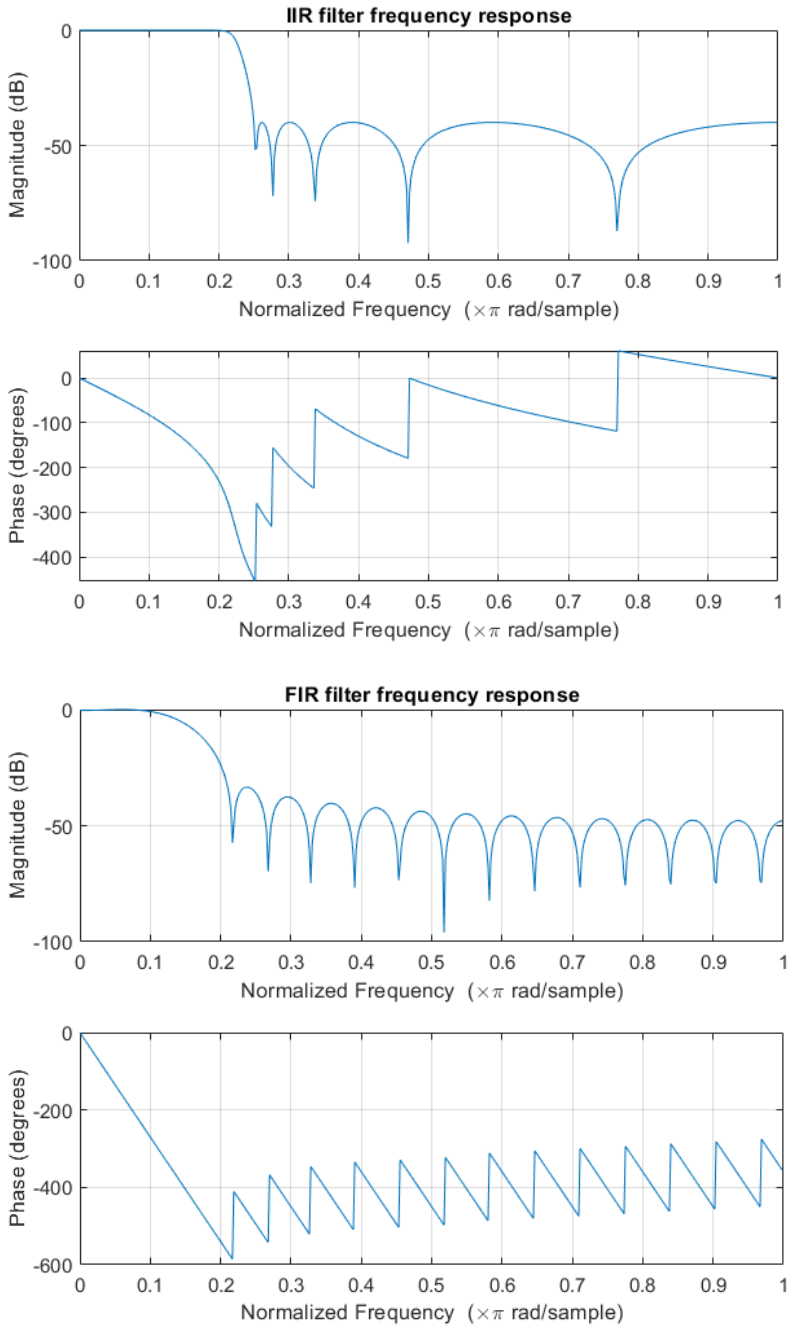
Result:

FIR filter produces good output removing most of the visible noise preserving features of the ECG wave data.

IIR filter output removes noise but some noise/distortion is still present in the output.



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