



Digital Filtering

preparing for the exam - part 4,
bilinear transform & equalizers

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Theoretical Examples

1. A 1st order analog low pass filter is described by its transfer function

$$H(s) = \frac{\omega_c}{s + \omega_c}.$$

Knowing the bilinear transform (without pre-warping) is defined as

$$s = 2f_s \frac{z - 1}{z + 1}$$

find the coefficients of a corresponding digital filter.

Practical Examples

2. In Sigma Studio, create a project for ADAU1701 processor that implements a stereo parametric equalizer consisting of three 2nd order sections:
 1. A low-shelf filter with gain -5 dB, cutoff frequency 200 Hz, and quality factor 1.0,
 2. a peaking filter with gain -8 dB, cutoff frequency 1 kHz, and quality factor 2.1,
 3. a low-pass filter with cutoff frequency 5 kHz, and quality factor 0.8.