High-Class Audio Multi-function Digital Filter SM5842AP/APT

Calculation of digital filter coefficients

$\omega_0 := 0.4535$ $\omega_1 := 0.5465$ $N := 4096$ $\omega := \text{dspl\_linspace}(0, 2\cdot\pi, N, \text{"periodic"})$ $bits := 24$

Design 3 Half-band linear phase FIR interpolators

$$H := \begin{bmatrix} hb\_fir(0.4535, 107.41, 167, bits) \\ hb\_fir\left(\frac{0.5}{2}, 102.4, 27, bits\right) \\ hb\_fir\left(\frac{0.5}{4}, 104, 15, bits\right) \end{bmatrix}$$

$$f_1 := \begin{bmatrix} \omega_0 & -140 \\ \omega_0 & 5 \end{bmatrix} \quad f_2 := \begin{bmatrix} \omega_1 & -140 \\ \omega_1 & 5 \end{bmatrix}$$

Calculate Graphics data to display response of entire filter

$$h := \begin{vmatrix} b := \begin{bmatrix} f\_osr(H_1, 4)\cdot 2^{-bits} \\ f\_osr(H_2, 2)\cdot 2^{-bits} \\ f\_osr(H_3, 1)\cdot 2^{-bits} \end{bmatrix} \\ \text{al\_convr1d}(b_1, \text{al\_convr1d}(b_2, b_3)) \end{vmatrix}$$

$ord := \text{length}(h) = 731$

$mag := \text{dspl\_filter\_freq\_resp}(h, 0, ord, \omega, \text{"mag|logmag"})_1$