EE 451

Using the Kaiser Window for Design of FIR Filters

The Kaiser window of length M is:

$$w_K(n) = \begin{cases} \dfrac{I_0[\beta(1-[(n-\alpha)/\alpha]^2)^{1/2}]}{I_0(\beta)}, & 0 \le n \le M-1. \\ 0, & \text{otherwise.} \end{cases}$$

where $\alpha = (M-1)/2$ and $I_0(\beta)$ is the zeroth-order modified Bessel function of the first kind. In MATLAB, you can calulate $I_0(\beta)$ using the `besseli(0,beta)` function.

$$\Delta\omega = |\omega_s - \omega_p|$$

$$A = -20\log_{10}\delta$$

$$\beta = \begin{cases} 0, & A > 21, \\ 0.5842(A-21)^{0.4} + 0.07886(A-21), & 21 \le A \le 50, \\ 0.1102(A-8.7), & A > 50, \end{cases}$$

$$M = \frac{(A-8)}{2.285\Delta\omega} + 1,$$

In MATLAB you can find the Kaiser window using the function `wk = kaiser(M,beta)`.