This is the README file for the dataset that is accompanying the IEEE Signal Processing Letter article "Optimizing a High-Order Graphic Equalizer for Audio Processing" by Jussi Rämö and Vesa Välimäki.

The dataset including the relevant Matlab scripts are available online at http://www.acoustics.hut.fi/go/ieee-spl-hogeq.

The Matlab scripts perform the optimization of the orders of a high-order graphical equalizer described in the article. There are three different possibilities for the bands of the graphical equalizer, which are Bark-band EQ, 1/3-octave EQ and octave EQ.

The zip file (26 KB) includes four files, including this README as well as geq_opt.m, ho_geq.m, and spect.m, where GEQ_OPT.m is the main file script that uses the two functions. The function ho_geq.m is the implementation of the high-order graphical equalizer and spect.m is a function that calculates the magnitude spectrum of the equalizer.

The user-definable inputs of the algorithm geq_opt.m are
bands = 1   choose: 1= Bark (25 bands), 2 = 1/3 octave (29 bands), 3 = octave (10 bands)
m_max = 20   Maximum number of 4th-order sections, max order N_max = 4*m_max = 2*M_max
i_start = 9   Start band
G_target = -20   Target gain
E_target = 2   Target error

The optimization algorithm is run by first setting the desired user-definable inputs and then by running the whole geq_opt.m script in Matlab. All the files included in the zip file, except the README must be in the same folder as the geq_opt.m. The script prints the calculated peak-error values in the command window and also plots the magnitude response of the equalizer filters that it is optimizing as it runs. When the optimization of the orders is done, the script displays the optimized orders in the command window and plots the magnitude response of the optimized graphic equalizer.