Matlab program for the design of the prototype filter based on the method suggested by Creusere and Mitra.

% This program is based on the method suggested by creusere and mitra.
clear, clf;
M=8;
ws=1/M;
wp=1/4/M;
[N,fpts,mag,wt]=remezord([wp,ws],[1,0],[0.000022334,0.0000044668]);
%N=127;
tolerance=0.000001;
inc=0.1*wp;
tcost=0;
way=-1;
pcost=10;
flag=0;j=0;
tic;
% optimisation of cost function.
% -------------------------------
while flag==0
  j=j+1;
  hopt=remez(N,[0,wp,ws,1],[1,1,0,0],[5,1]);
  h=fft(hopt,4096);
  P=floor(2048/M);
  hl=zeros(P,l);
  for k=1:P
    hl(k)=abs(h(P-k+2))+abs(h(k))
  end
  tcost=max(abs(h1-ones(max(size(h1)),1)));
  if tcost>pcost
    inc=inc/2;
    way=-way;
  end
  if abs(pcost-tcost)<tolerance
    flag=1;
  end
  pcost=tcost;
  wp=wp+way*inc;
end
% Plot of magnitude response of the optimal prototype filter
% -------------------------------
[h₁z, w] = freqz(hopt, 1, 256);
hi l = 20 * log10(abs(hlz));
plot(w/pi, hll);
xlabel('normalised frequency \omega/\pi');
ylabel('magnitude in dB');
pause;
p0 = hopt;

% deriving the M - channel analysis filter bank
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\texttt{h = zeros(M, N+1);}
\texttt{f = zeros(M, N+1);}
\texttt{for k = 0: M - 1}
\texttt{\hspace{0.5cm} for n = 0: N}
\texttt{\hspace{1cm} h(k+1, n+1) = 2 * p0(n+1) * cos(pi/M*(k+0.5)*(n-(N-1)/2)+(-1)^k*pi/4);}
\texttt{\hspace{1cm} f(k+1, N+1-n) = h(k+1, n+1);}
\texttt{end}
\texttt{end}
\texttt{for k = 1: M}
\texttt{\hspace{0.5cm} [Hz, w] = freqz(h(k,:), 1, 256*M/2);}
\texttt{\hspace{0.5cm} Hz = abs(Hz);}
\texttt{\hspace{0.5cm} plot(w/pi, 20*log10(Hz));}
\texttt{\hspace{0.5cm} hold on;}
\texttt{\hspace{0.5cm} end}
\texttt{\hspace{0.5cm} hold off;}
\texttt{\hspace{0.5cm} pause;}
\texttt{\hspace{0.5cm} a = zeros(M, 2*N+1);}
\texttt{for m = 0: M - 1}
\texttt{\hspace{0.5cm} for k = 0: M - 1}
\texttt{\hspace{1cm} a(m+1,:) = a(m+1,:) + conv(h(k+1,:), exp(-i*[0:N]*2*pi*m/M), f(k+1,:));}
\texttt{\hspace{0.5cm} end}
\texttt{\hspace{0.5cm} end}
\texttt{N1 = 256;}
\texttt{%}
\texttt{% plot of distortion function}
\texttt{%}
\texttt{[h₁, w] = freqz(a(:,1), 1, 256*M/2);}
\texttt{\% plot(w(1:N1*M/2)/pi,(abs(h₁(1:N1*M/2)))};
\texttt{plot(w/pi,(abs(h₁)));}