```
% SRRC Creat an oversampled square-root raised cosine pulse
%    SRRC(N, alf, P) creates an oversampled SRRC pulse, where
%    N is one half the length of srrc pulse in symbol durations,
%    alf is the rolloff factor (between 0 and 1; alf=0 gives a sinc pulse),
%    P is the oversampling factor (a positive integer).
%    SRRC(N, alf, P, t_off) works the same way, but offsets the pulse
%    center by t_off fractional samples.

function g = srrc(N, alf, P, t_off);

if nargin==3, t_off=0; end;           % if unspecified, offset is 0
k = -N*P+1e-8+t_off:N*P+1e-8+t_off;   % sampling indices as multiples of T/P
if alf==0, alf=1e-8; end;             % numerical problems if alf=0
g = 4*alf/sqrt(P)*(cos((1+alf)*pi*k/P)+sin((1-alf)*pi*k/P)./(4*alf*k/P))./...
         (pi*(1-16*(alf*k/P).^2));
```