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% gda01_07
% plot example of filter, both as wiggles and a matrix
% supports figures

clear all;

% load exemplary filter (for a seismometer)
D = load(' ../data/seismometer_response.txt');
t = D(:,1);
g = D(:,2);
N = length(t);
Dt=t(2)-t(1);

figure(2);
set(gcf,'pos',[10, 10, 900, 400] );
clf;

% build data kernel corresponding to convolution by this filter
G = toeplitz( g, [g(1), zeros(1,N-1)] );

% plot filter, as wiggles
clist = [1:17:N]';
Nc = length(clist);
for i=[1:Nc]
    subplot(1,Nc+2,i);
    hold on;
    set(gca,'LineWidth',3);
    set(gca,'XAxisLocation','top');
    axis ij;
    axis( [-max(abs(g)), max(abs(g)), t(1), t(end)] );
    plot(G(:,clist(i)),t,'k-','LineWidth',3);
    xlabel(sprintf('g(t-%.1f)',(clist(i)-1)*Dt));
    if( i==1 )
        ylabel('time (s)');
    end
end

% build model parameters
m = zeros(N,1);
m(1:floor(N/5)) = 0.5*1e-6*sin( pi*([1:floor(N/5)]'-1)/(N/5-1));

% plot input (model parameters, ground motion)
subplot(1,Nc+2,Nc+1);
hold on;
set(gca,'LineWidth',3);
set(gca,'FontSize',14);
set(gca,'XAxisLocation','top');
axis ij;
axis( [-max(abs(m)), max(abs(m)), t(1), t(end)] );
plot(m,t,'b-','LineWidth',3);
xlabel('m');

d = G*m; % perform convolution

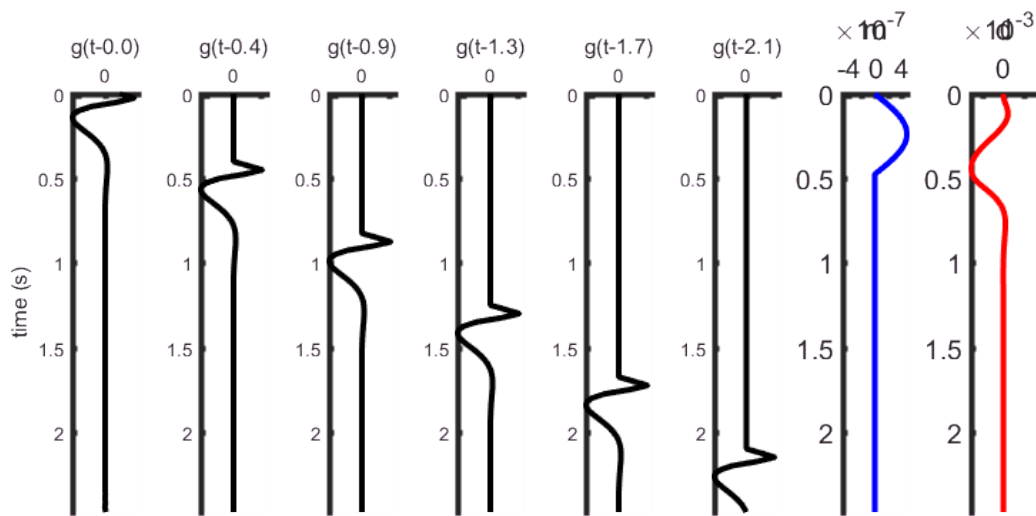
% plot output (data, seismometer response)
subplot(1,Nc+2,Nc+2);
hold on;
set(gca,'LineWidth',3);
set(gca,'FontSize',14);

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set(gca, 'XAxisLocation', 'top');
axis ij;
axis( [-max(abs(d)), max(abs(d)), t(1), t(end)] );
plot(d,t,'r-','LineWidth',3);
xlabel('d');

```

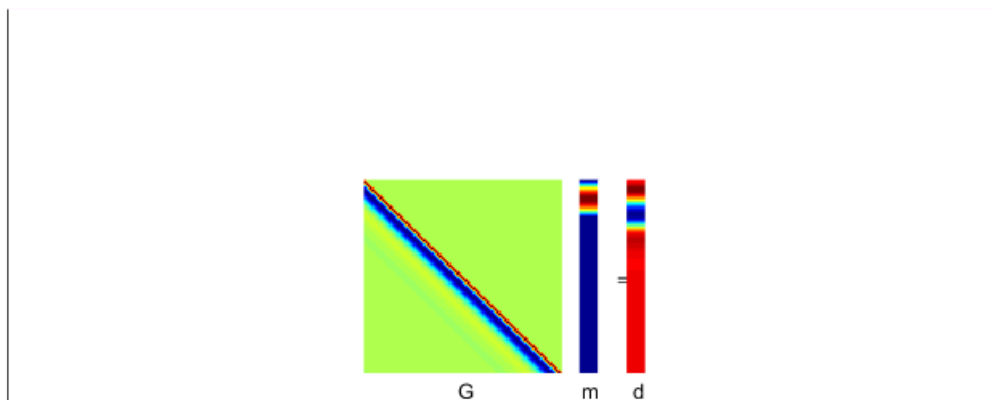


% Figure 1.8 Graphical depiction of the linear equation $d=Gm$ for a convolution. Note that the
 % G is Toeplitz (meaning that it has constant diagonals). MatLab script gda01_07.

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% plot as matrix
gda_draw(G, 'caption G', m, 'caption m', '=', d, 'caption d');

```



% Figure 1.8 Graphical depiction of the linear equation $d=Gm$ for a convolution. Note that the
 % G is Toeplitz (meaning that it has constant diagonals). MatLab script gda01_07.