

APPENDIX

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t = [6e-06;-1.7e-05; 4e-06;-4e-06;0; 1.9e-05; -5e-06;5e-06];
s2=sqrt(2);
G = [1,0,0,1,0,0,1,0,0;
     0,1,0,0,1,0,0,1,0;
     0,0,1,0,0,1,0,0,1;
     1,1,1,0,0,0,0,0,0;
     0,0,0,1,1,1,0,0,0;
     0,0,0,0,0,0,1,1,1;
     s2,0,0,0,s2,0,0,0,s2;
     0,0,0,0,0,0,0,0,s2];
% Find dimensions of G
[m,n]=size(G);
Gdagger = pinv(G);
% Get the singular values for the system matrix
[U,S,V] = svd(G);
p=rank(G);
diag(S);
Vp = V(:,1:p);
Up =U(:,1:p);
Sp = S(1:p,1:p);
%Gdagger*G;
%traceR1 = sum(diag(Gdagger*G));
Rm = Vp*Vp';
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figure(3)
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clf
colormap('gray')
imagesc(Rm)
caxis([-0.2 1.0])
set(colorbar, 'FontSize', 18);
set(gca, 'xtick', [1,2,3,4,5,6,7,8,9]);
set(gca, 'ytick', [1,2,3,4,5,6,7,8,9]);
xlabel('j')
ylabel('i')
title('Model Resolution Matrix')
trace_Rm = trace(Rm);
%G*Gdagger;
%traceR = sum(diag(G*Gdagger));
Rd = Up*Up';
% Find and display data resolution matrix
%reshape(diag(Rd),3,3)
figure(3)
clf
colormap('gray')
imagesc(Rd)
caxis([-0.2 1.0])
set(colorbar, 'FontSize', 18);
set(gca, 'xtick', [1,2,3,4,5,6,7,8,9]);
set(gca, 'ytick', [1,2,3,4,5,6,7,8,9]);
xlabel('j')
ylabel('i')
title('Data Resolution Matrix')
trace_Rd = trace(Rd);
I = eye(9);
Rm - I;
Vo = V(:,p+1:n);
-Vo*Vo'

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norm(-Vo*Vo',2);
traceRm - n;
figure(10)
clf
for i=1:n
    mtest1=zeros(n,1);
    mtest1(i)=1;
    dtest=G*mtest1;
    mdagger(:,i) = pinv(G)*dtest;
end
for i=1:n
    colormap('gray')
    subplot(3,3,i)
    imagesc(reshape(mdagger(:,i),3,3)');

    set(gca,'xtick',[1,2,3]);
    set(gca,'ytick',[1,2,3]);
    xlabel('j')
    ylabel('i')
    set(colorbar,'FontSize',18);
    title(sprintf('m%d ',i))
    set(gcf, 'PaperSize', [4 2])
end
Condition_number_Gdagger = cond(pinv(G));
Condition_number_Gdagger =cond(G);
Sp(1,1)/ Sp(7,7);

```