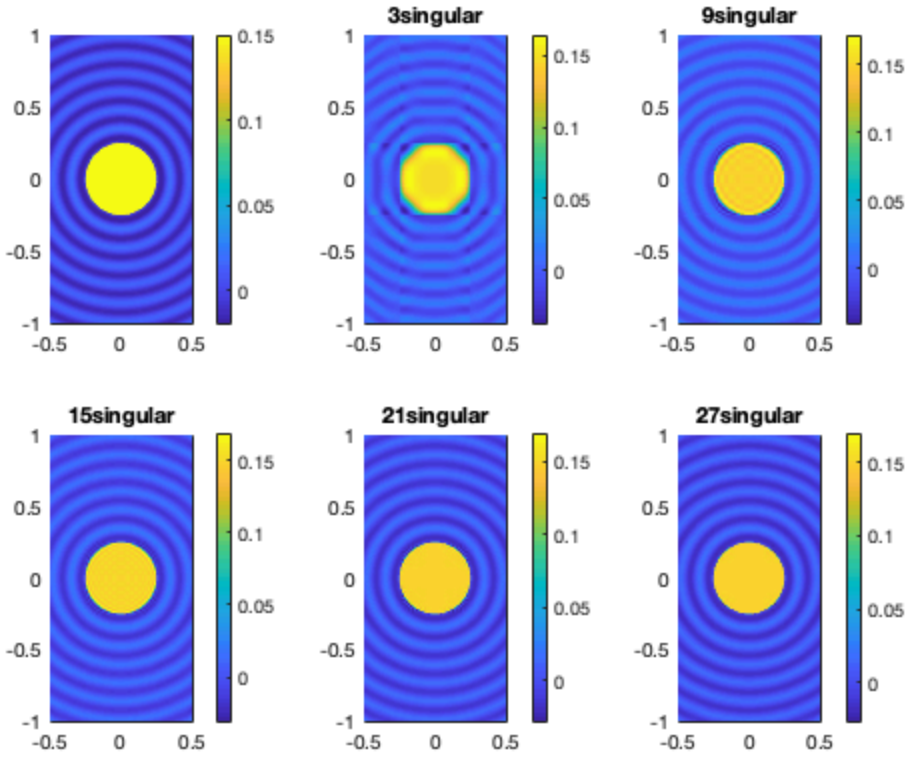
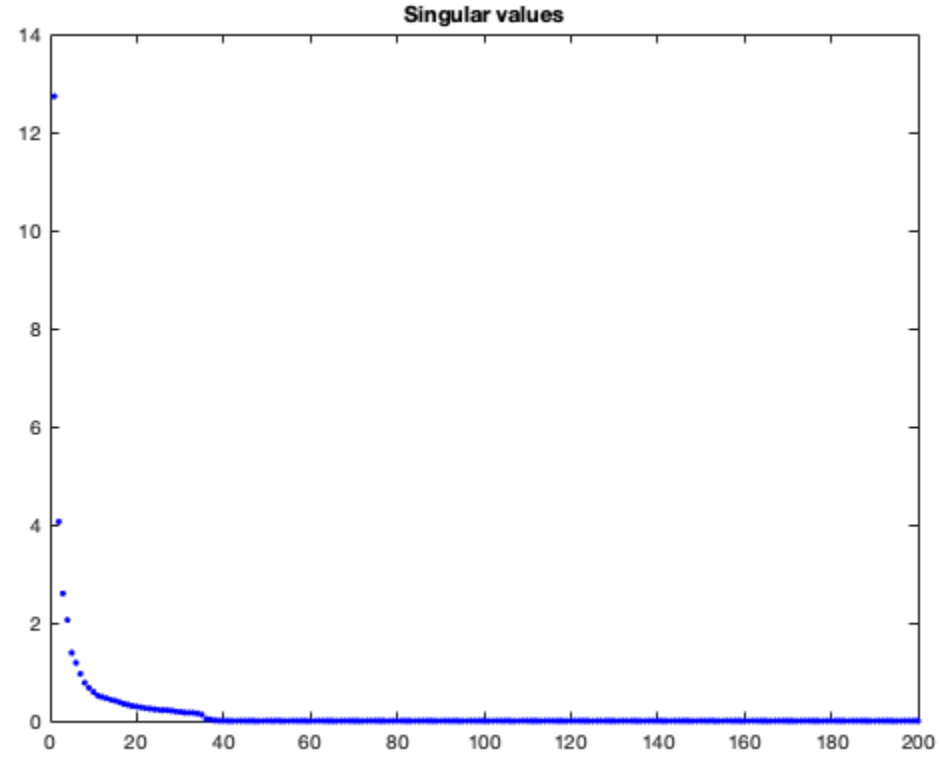
```
n = 200;
x = linspace(-0.5,0.5,n);
m = 400;
y = linspace(-1,1,m);
for i=1:m
    for j=1:n
        F(i,j) = f(x(j),y(i));
    end
end
subplot(2,3,1)
pcolor(x,y,real(F)), shading interp, colorbar
[U,S,V]  = svd(F);
jj=0;
for p=1:2:9
    jj=jj+1;
    k = 3*p;
    Fk = U(:,1:k)*S(1:k,1:k)*(V(:,1:k))';
    subplot(2,3,jj+1)
    pcolor(x,y,real(Fk)), shading interp, colorbar
    title([ num2str(k) 'singular'])
end


figure;
plot(diag(S),'b.');
title('Singular values');



function z=f(x,y)

r = sqrt(x.^2+y.^2);
kappa = 50;
z = cos(kappa*r)/kappa - ...
    (cos(kappa)+sin(kappa)*1i)*besselj(0,kappa*r)...
    /(kappa *(besselj(0,kappa)+1i*besselj(1,kappa)));

if r<0.25
    z=0.15;
end

end
```


3singular
9singular
15singular
21singular
27singular


Singular values

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