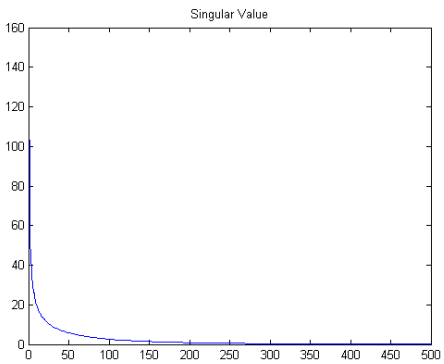
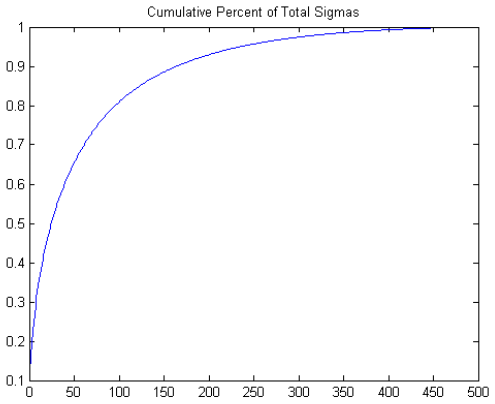
Image Compression

```
% Read the picture of the tiger, and converts it to black and white.
tiger = rgb2gray(imread('tiger.jpg'));

% Downsize the sample, just to avoid dealing with high-res images.
tiger = im2double(imresize(tiger,.5));
imshow(tiger); %plot the tiger

% Compute SVD of the tiger
[U, S, V] = svd(tiger);

% Plot the magnitude of the singular values (log scale)
sigmas = diag(S);
figure; plot(sigmas); title('Singular Value');
%figure; semilogy(sigmas);
figure; plot(cumsum(sigmas) / sum(sigmas));
title('Cumulative Percent of Total Sigmas');

n = 100; % rank=n, choose first n singular values
approx_sigmas = sigmas(1:n);
approx_S = diag(approx._sigmas);
approx_tiger = U(:,1:n) * approx_S * V(:,1:n)';
imshow(approx_tiger)
```



Singular values



Cumulative percent of total singular values

Full-Rank Tiger

Rank 200 Tiger

Rank 100 Tiger

Rank 50 Tiger

Rank 30 Tiger

Rank 20 Tiger

Rank 10 Tiger

Rank 3 Tiger