

8. Type in the commands and explain what is going on when you vary *eps*.

```
load clown
Y=X(:, [2:320, 1]);
Z = abs(X-Y);
M = max(Z(:));
eps = 0.5;
Z(find(Z < eps*M)) = 0;
imshow(Z, []);
```

3. Energy, Noise and Distortion

9. Write out a script to compute the energy of an $m \times n$ image X where energy $= \frac{\|X\|^2}{mn}$. Suggestion: first flatten X via $Y = X(:)$.

10. Now add some noise $Y = X + \epsilon N$, where X is some image. The noise image N ($N=2*\text{rand}(m,n)-1$) has its entries uniformly distributed between -1 and 1 , and the parameter ϵ measures the strength of the noise. Compute the maximum distortion (see notes) you can allow and still have reasonable fidelity. Use a grayscale for showing the image.

$$\frac{\|Y - X\|^2}{\|X\|^2} = \frac{\|\epsilon N\|^2}{\|X\|^2} = \epsilon^2 \frac{\|N\|^2}{\|X\|^2}.$$