Slide 1

- Use FIR filters to filter images
- multi-dimensional signals can filtered separately by rows and columns using linearly separable filters
- Use code structure from last lab

Image Processing II Lab

Slide 2

- Filter smoothes pixels by averaging them together
- Low-pass filter that keeps slow spatial frequencies
- Effect is to blur an image
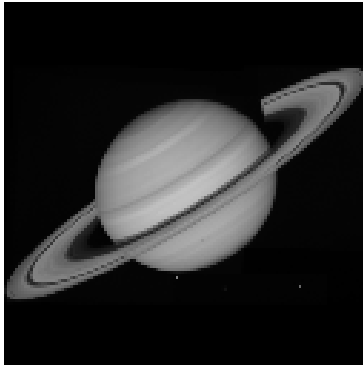- Reduces noise since its effects tend to cancel out

Averaging Filters

Slide 3

- Public domain image courtesy of NASA, Voyager 2 image, 1981-08-24,
- NASA catalog #PIA01364
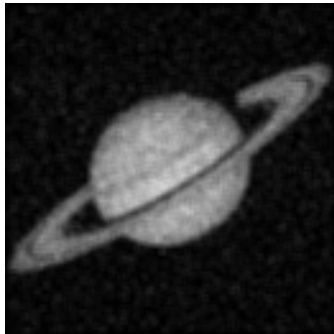

Original Image

Slide 4

Gaussian   Salt and Pepper

Additive Noise
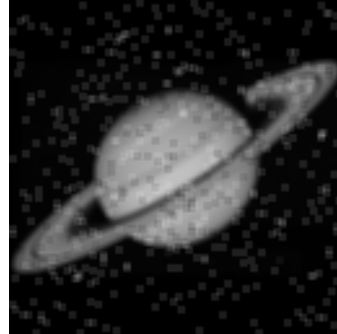
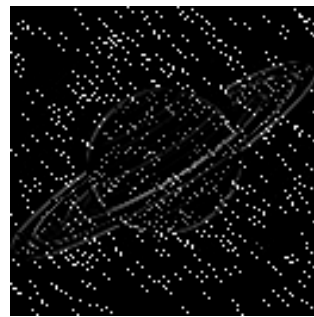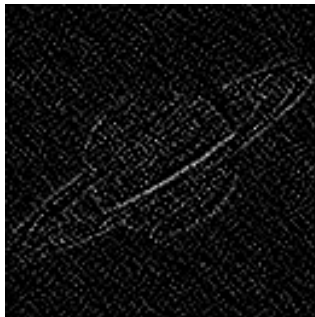M=3   M=3

Example Low Pass Filter

- Takes the form of a derivative, looking for change in a signal.
- Sudden changes in images are usually edges.
- Examples: [1 0 -1]
- Highly susceptible to noise degradation

High-Pass Filter

H = [1 0 -1] in both directions

Image Processing: Edges

- Since high-pass filters find edges, but are susceptible to noise
- Common approach: blur first, then find edges and general shape

Edge Finding

- Image file doesn't need to have proper suffix for Matlab, just let program know that it is a Matlab file
  - load fn -mat

Problems and Notes