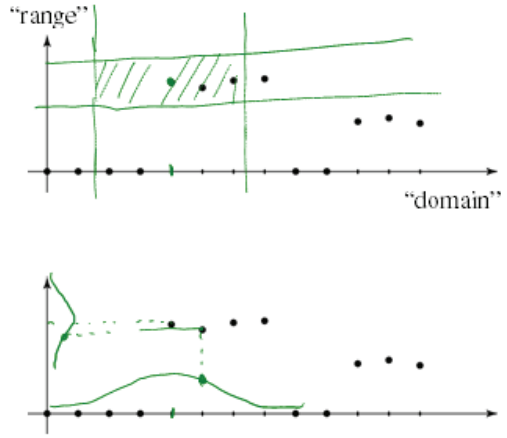
Bilateral filtering

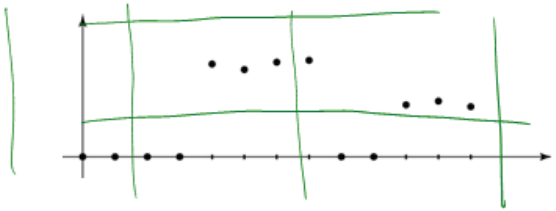
Bilateral filtering

Bilateral filtering is a method to average together nearby samples only if they are similar in value.



Bilateral filtering

We can also change the filter to something "nicer" like Gaussians:



Recall that convolution looked like this:

$$g[i] = \sum_{i'} f[i']h[i - i']$$

Bilateral filter is similar, but includes both range and domain filtering:

$$g[i] = 1/C \sum_{i'} f[i']h_{\sigma_s}[i - i']\, h_{\sigma_r}(f[i] - f[i'])$$

and you have to normalize as you go:

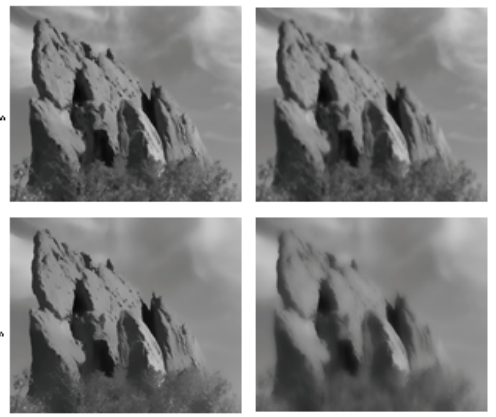
$$C = \sum_{i'} h_{\sigma_s}[i - i']\, h_{\sigma_r}(f[i] - f[i'])$$

Input

$\sigma_r = 0.1$ $\sigma_r = 0.25$

$\sigma_s = 2$

$\sigma_s = 6$



Paris, et al. SIGGRAPH course notes 2007