Bilateral filtering
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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:

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

Recall that convolution looked like this:

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

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

and you have to normalize as you go:

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