CIS580 Problem Set 7

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Contents

1 Scale Invariant Detection

1.1 Laplacian of Gaussian

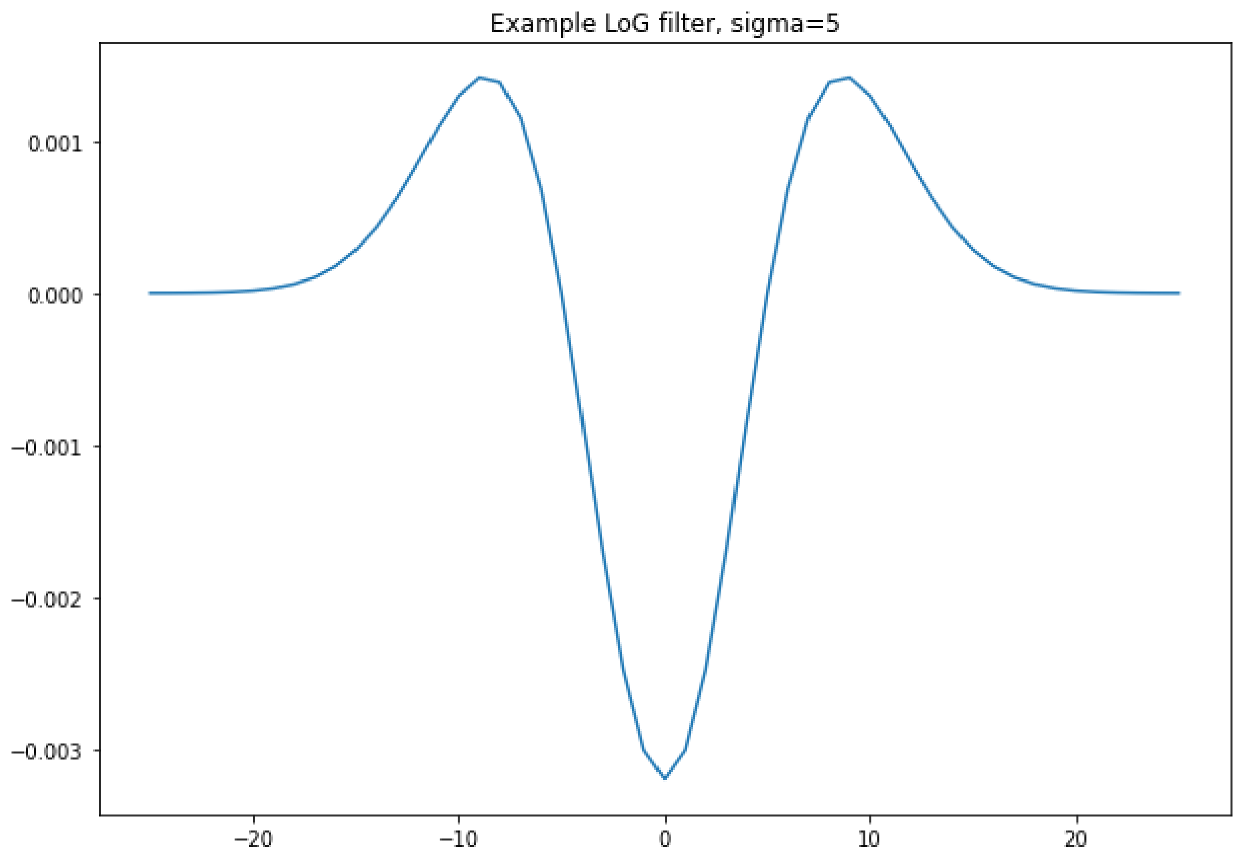

Figure 1

1.2 Approximating a LoG by a DoG

1.2.1 Difference of Gaussians

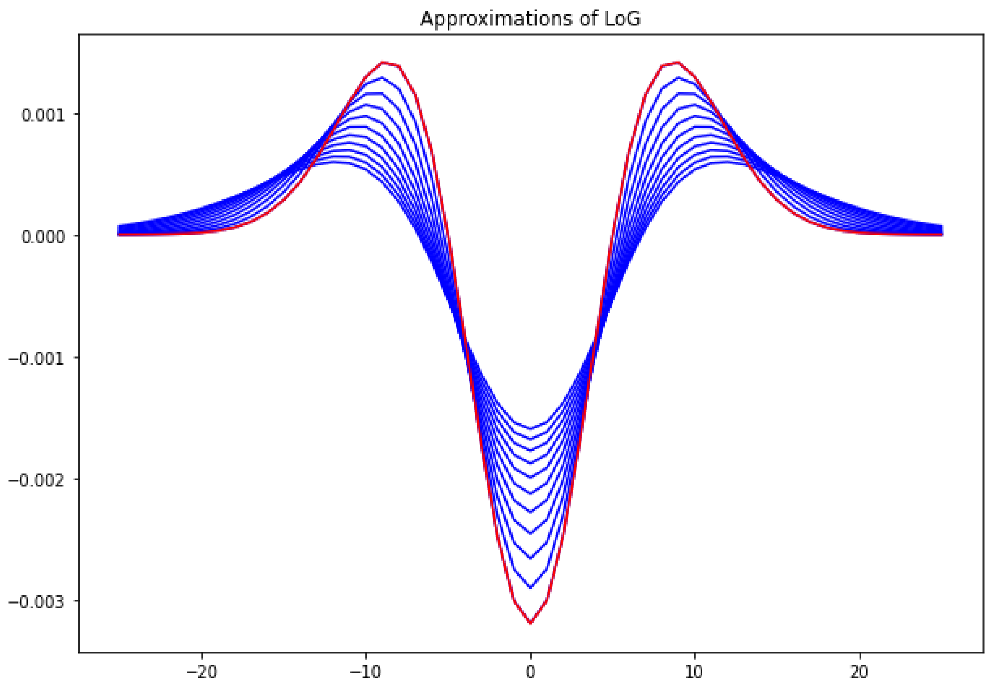

Figure 2

The plots obtained indicate that as k increases from $1 \rightarrow 2$, the Difference of Gaussians approximation is scaled down in magnitude.

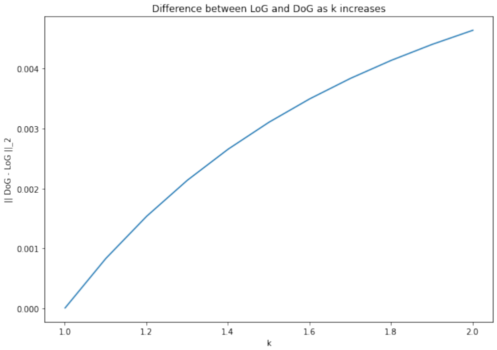

Figure 3

1.2.2 DoG gets closer to LoG as $k \to 1$

We exepect this to happen because in the provided expression, as $k \to 1$, the LoG will approach the DoG.

$$\mathrm{LoG}_\sigma = \frac{1}{(k-1)\sigma^2}\mathrm{DoG}_\sigma$$

1.2.3 Dropping the normalizing factor

We intentionally forget the normalizing factor and just use the difference of Gaussians because the product of a scalar and a Normal distribution will simply apply the constant as a scaling factor to both terms in the DoG expression.