Environment Requirements

MATLAB R2020a - for `exportgraphics()`

Statistics and Machine Learning Toolbox - for `normpdf()`, `mvnpdf()`, ..., etc.

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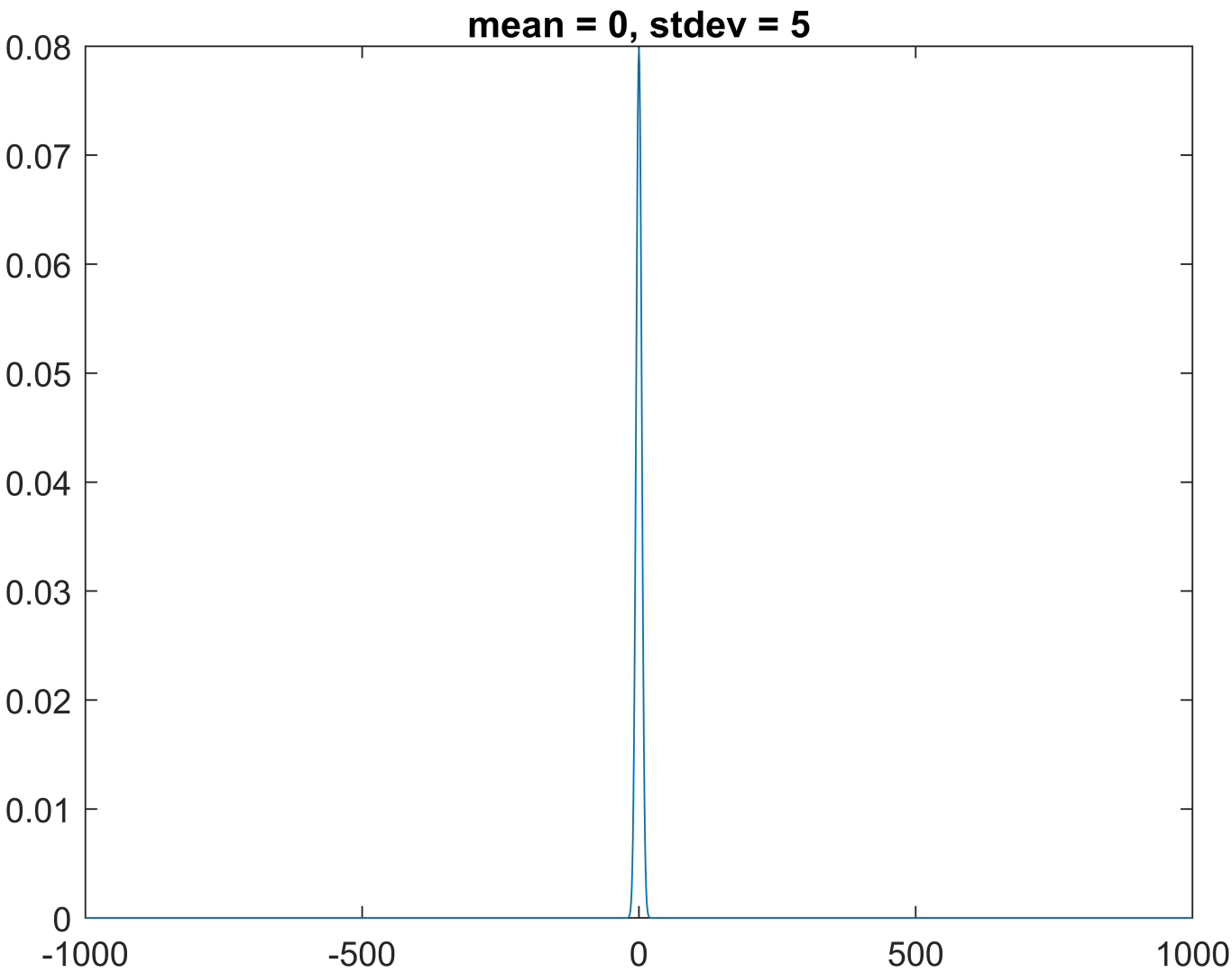
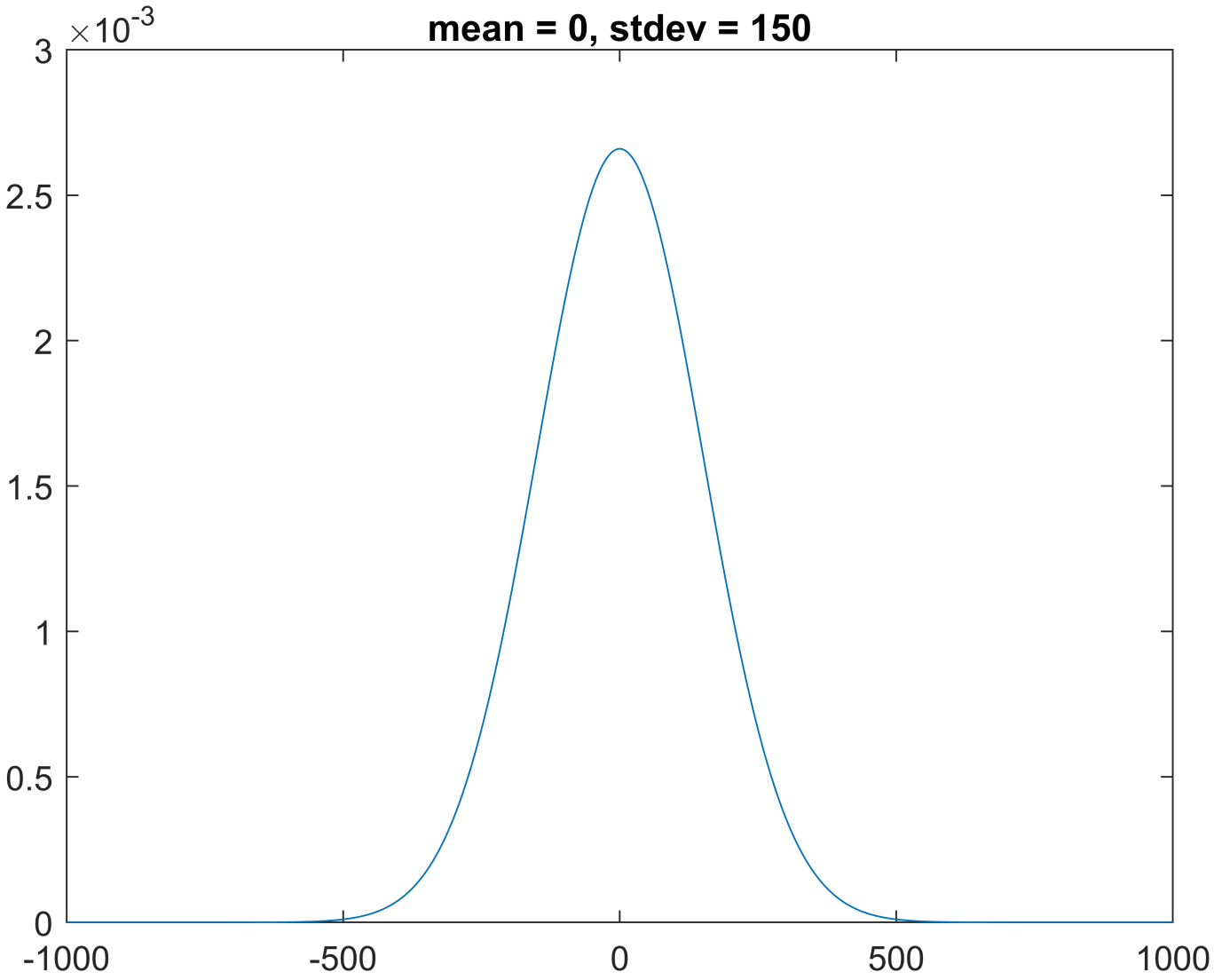
Plot Gaussian Distribution using MATLAB

Plot the 1D Gaussian curve for x = -1000 to 1000 with step size = 1 (-1000, -999, -998, ..., 998, 999, 1000) and the following μ and σ:

a) $\mu = 0, \sigma = 5$

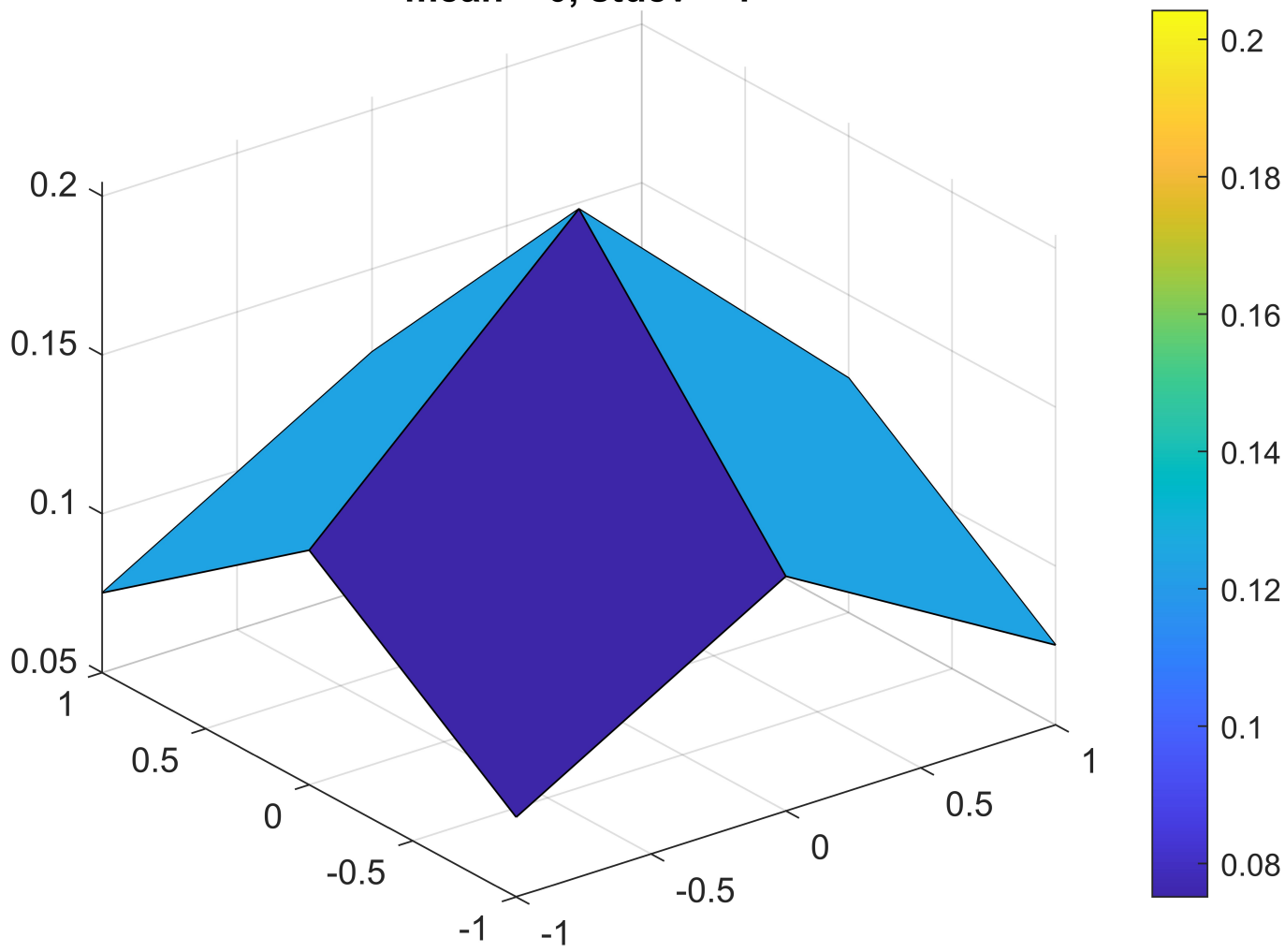


b) $\mu = 0, \sigma = 150$



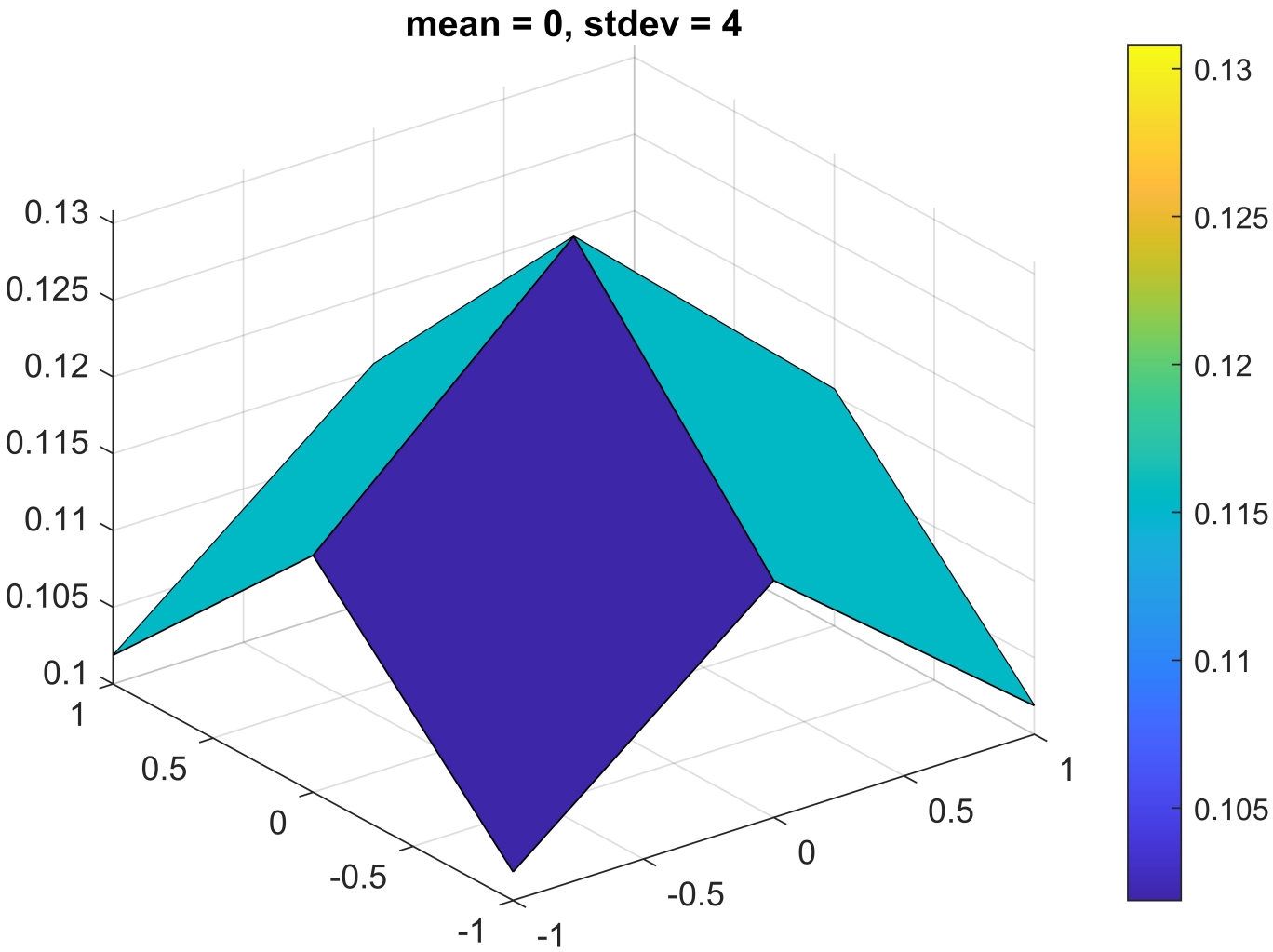
Produce the 3*3 Gaussian filter by 2-D Gaussian formula with

a) $\mu = 0$, $\sigma = 1$ and



$$\begin{bmatrix} 0.0751 & 0.1238 & 0.0751 \\ 0.1238 & 0.2042 & 0.1238 \\ 0.0751 & 0.1238 & 0.0751 \end{bmatrix}$$

b) $\mu = 0, \sigma = 4$



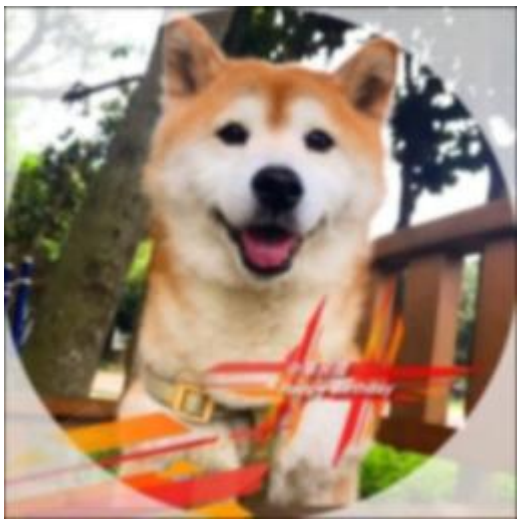
$$\begin{bmatrix} 0.1019 & 0.1154 & 0.1019 \\ 0.1154 & 0.1308 & 0.1154 \\ 0.1019 & 0.1154 & 0.1019 \end{bmatrix}$$

Implement the CONVOLUTION operation and apply the two masks a) 3*3, $\mu = 0, \sigma = 1$, b) 7*7, $\mu = 0, \sigma = 1$ to 柴犬飛飛.jpeg. Compare the results of a) and b) and draw your conclusion.

The original picture is

a)

b)



The result shows that the former convolution looks clearer than the latter.