Implement the Marr-Hildreth edge detection procedure for the image attached with $n = 25$ and $\sigma = 4$.

The Marr-Hildreth edge detection procedure is described as follows:

The output image is denoted

$$g(x, y) = \nabla^2[G(x, y) \star f(x, y)]$$

Where $f(x, y)$ is the input image and $\star$ denotes convolution. The $\nabla^2[.]$ is the Laplacian operator. The $G(x, y)$ is defined as

$$G(x, y) = e^{-\frac{x^2+y^2}{2\sigma^2}} \; for \; x = 0 \ldots 24 \; and \; y = 0 \ldots 24$$

The steps are as follows:

1. Filter the input image with an $n \times n$ Gaussian lowpass kernel obtained by sampling $G(x, y)$ for $x = 0 \ldots 24$ and $y = 0 \ldots 24$.
2. Compute the Laplacian of the image resulting from Step 1 using, for example, the 3×3 Laplacian kernel.
3. Find the zero crossings of the image from Step 2

One approach for finding the zero crossings at any pixel p, of the filtered image $g(x, y)$, is to use a 3×3 neighborhood centered at p. A zero crossing at p implies that the signs of at least two of its opposing neighboring pixels must differ. There are four cases to test: left/right, up/down, and the two diagonals.