

Mathematical Morphology

- White top-hat: It transforms I using following equation:

$$T^w_{(i,j)} = I - (I \circ S_{(i,j)})$$

where, \circ denotes the opening operation.

- Black top-hat: It transforms I using following equation:

$$T^B_{(i,j)} = (I \bullet S_{(i,j)}) - I$$

where, \bullet denotes the closing operation.

- Top-hat transforms are used for various image processing tasks, such as feature extraction, background equalization, image enhancement, etc.

Lab work: MATLAB

- Consider same matrix I and structuring element S .

10	20	85	97	55
40	60	70	66	52
9	70	90	87	12
15	54	33	60	11
6	26	73	59	9

1	1	1
1	1	1
1	1	1

- Apply white top-hat or black top-hat through the same two corners of the matrix, and compare it with analytically calculated results.