

Computer Vision

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Lesson 1

Exercises

Homogeneous Coordinates and Projective Camera Models

1). Assume a camera at position $(0, 0, 2)$ and orientation $(-\pi/2, 0, 0)$ with focal length F , equipped with a 512×512 pixel retina in which pixels are size 0.02 (mm/col) et 0.01 (mm/row) and an optical axis that intersects the retina at pixel $(256, 256)$.

a) Write the formula for the camera projective matrix \mathbf{M}_s^i .

b) A synchronization error causes each row to be shifted to the right by α pixels.

Write the resulting transformation from retina to image \mathbf{C}_r^i as well as the resulting projective matrix \mathbf{M}_s^i .