Orientation of an Image Pair

The relative orientation of an image pair is defined by the *epipolar geometry*. Using algebraic projective geometry, the epipolar geometry can be represented by the *fundamental matrix*.

Task 1 – Image Acquisition

Take pictures of a spatially structured (i.e. non-planar) object from two different views. Use a general *convergent image arrangement*.

Task 2 – Image Pair Orientation

a) Manually pick at least 8 homologous points $x \leftrightarrow x\,0$ in the image pair and implement an Octave / MATLAB / Python function for the linear computation of the *fundamental matrix* ***F***. Use the normalized 8-point algorithm.

b) Select points in both images (e.g. get_points) and draw the associated *epipolar lines* in the corresponding image. For drawing lines in homogeneous coordinates $l = (a, b, c)^T$ use the auxiliary function hline.m.

Task 3 – Evaluation

a) Show the image pair and comment on the line characteristics in brief.

b) Calculate the *geometric image error* (symmetric epipolar distance) of ***F*** for all points.