Homework 4

16-720A Computer Vision

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Q 1.1

We know

$$pFp' = 0$$

Given the problem constraint that the point in question lies at $(0, 0)$ on the camera plane, we can write

$$\begin{bmatrix} 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} f_{1,1} & f_{1,2} & f_{1,3} \\ f_{2,1} & f_{2,2} & f_{2,3} \\ f_{3,1} & f_{3,2} & f_{3,3} \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

Q 1.2

Q 1.3

Q 1.4

Q 2.1

$$F = \begin{pmatrix} -1.4444E10^{-9} & -7.8627E10^{-8} & 0.0011327 \\ -1.1205E10^{-7} & 1.2618E10^{-9} & 4.1543E10^{-6} \\ -0.0010881 & 0.000015377 & -0.0046423 \end{pmatrix}$$

Q 2.2

$$F = \begin{pmatrix} 3.0708E10^{-8} & 3.5025E10^{-7} & 0.0016039 \\ -1.5483E10^{-7} & 9.2714E10^{-9} & 0.000054917 \\ -0.0016465 & -0.000030733 & -0.0091395 \end{pmatrix}$$

Give

Q 3.1

$$E = \begin{pmatrix} -0.0033389 & -0.18241 & 1.692 \\ -0.25994 & 0.002938 & -0.044874 \\ -1.6971 & -0.012332 & -0.00062738 \end{pmatrix}$$

Q 3.2

Q 4.1

Q 4.2

Q 4.3