Algorithms and applications in computer vision, Spring 2021, Quiz #9
Due: June 6, 23:59 PM

Q1 In class we have proven that the essential matrix equals $E = R[dC_\times]$

Show it can also be expressed as $E = [t_\times]R$ with $t = -RdC$

Q2 Consider three images I_1, I_2, I_3 that have been captured by a system of three cameras, and suppose the fundamental matrices F_{12}, F_{13}, F_{23} are known.
Notation: F_{ij} satisfies the constraint $p_j^T F_{ij} p_i = 0$ for any corresponding pair of points $p_i \leftrightarrow p_j$ in images I_i, I_j

1) Show that in the general case we can predict the position p_3 in the 3rd image given p_1, p_2 and the Fundamental matrices. Write an expression for p_3 .
2) Describe a degenerate configuration of 3 cameras where this point cannot be determined uniquely.

Q3 Consider a 3D point which is projected in both cameras to the point $p = (0,0)\ p' = (0,0)$
Show that this implies that the entry $F(3,3)$ of the fundamental matrix is 0.