1. $\overrightarrow{e_3} = \frac{\overrightarrow{u}}{|\overrightarrow{u}|}, \theta = \arccos\left(\frac{\overrightarrow{u}\,\overrightarrow{t}}{|\overrightarrow{u}||\overrightarrow{t}|}\right), \overrightarrow{e_1} = \frac{\overrightarrow{t} \times \overrightarrow{u}}{|\overrightarrow{t}||\overrightarrow{u}|\sin(\theta)}, \overrightarrow{e_2} = \overrightarrow{e_3} \times \overrightarrow{e_1}.$
2. We can write the function of plane, write the function of line PC. We can then compute the coordinate of P' by solving the equation system.
3. Using the function of $\overline{P_1P_2}$, $\overline{Q_1Q_2}$, solve the equation system to get the coordinate of the R. If $(R - Q_1) \cdot (R - Q_2) \leq 0$ and $(R - P_1) \cdot (R - P_2) \leq 0$, R is the intersection point.
4. By the coordinates of Q_1, Q_2, Q_3, we can get the function for the plane which T in. And by the coordinate of C and by vector $\overrightarrow{d}$, we can get the function for the line that r is on. Solve the equation system, we can get the coordinate of Q. If $(Q - C) \cdot \overrightarrow{d} \geq 0$, and $Q = aQ_1 + bQ_2 + cQ_3$, where $a + b + c = 1$ and $a \geq 0$,$b \geq 0$,$c \geq 0$, then Q is the intersection point.