F21RO   INTELLIGENT ROBOTICS   TUTORIAL 3 EULER ANGLES

QUESTIONS

1. Derive robust formulae for the three Z-Y-Z Euler angles which describe the orientation contained in a homogeneous transformation of the form –

$$
\begin{pmatrix}
n_x & o_x & a_x & p_x \\
n_y & o_y & a_y & p_y \\
n_z & o_z & a_z & p_z \\
0 & 0 & 0 & 1
\end{pmatrix}
$$

2. In what sense are the formulae you have derived robust?

3. Calculate the Z-Y-Z Euler angle set that would produce a re-orientation of a manipulator's tool centre point of 180° about its local *x*-axis followed by -90° about its local *y*-axis.