Rigid body dynamics, SG2150

Hand in assignments, set 1, HT 2009

Due Friday 11/9

1) Solve Problem 1.8 at the end of Chapter 1, page 15, in Dynamics of Bodies.

2) Solve Problem 2.3 at the end of Chapter 2, page 38, in Dynamics of Bodies.

3) Assume that a rigid body is rotated from a reference orientation (where the Euler angles are zero) to a different orientation with Euler angles given by:

$$\psi = \text{yy degrees}, \ \theta = 10\,\text{mm degrees}, \ \varphi = 5\,\text{dd degrees},$$

where yymmdd are year, month, and day of birth as they appear in your Swedish person number. Example: If you are born 871002 you should have $\psi = 87°, \theta = 100°, \varphi = 10°$. Write a program that calculates the resulting rotation angle ϕ and the unit vector $(\cos\alpha_1, \cos\alpha_2, \cos\alpha_3)$ of the rotation axis. Use formulas of Chapter 2, and symmetry and anti symmetry of matrices. Use Matlab or Maple or whatever.

4) Solve Problem 3.6 at the end of Chapter 3, page 56, in Dynamics of Bodies.

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