

ME 115(a): Homework #2

(Due Thursday, February 2, 2006)

Problem 1: (10 points) Do Problem 12, Chapter 2 of MLS.

Problem 2: (10 points) Do Problem 10 (a,b) in Chapter 2 of MLS. Do not worry about the question of surjectivity in 10(b).

Problem 3: (10 points) Do Problem 8(b) in Chapter 2 of MLS.

Problem 4: (10 points) Do Problem 5 in Chapter 2 of MLS.

Problem 5: (10 points) Let

$$R = \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix}$$

be a matrix in $SO(3)$. Show that $\text{cof}(r_{ii}) = r_{ii}$ for matrices in $SO(3)$.

Problem 6: (10 points) Do Problem 4(a,b) in Chapter 2 of MLS.

Problem 7: (5 points) Consider the following rotation matrix:

$$\begin{bmatrix} 0.866025 & -0.353553 & 0.353553 \\ 0.353553 & 0.933013 & 0.0669873 \\ -0.353553 & 0.0669873 & 0.933013 \end{bmatrix}$$

Find the axis of rotation and angle of rotation associated with this rotation.