

Math 4220/6220 Homework #3

This homework assignment covers sections 5 and 6 of Guillemin and Pollack.

G & P, p. 26-27. # 7, # 13.

1. Let $X = \{x \in \mathbf{R}^6 \mid x_1x_6 - x_2x_5 + x_3x_4 = 0, \|x\|^2 = 1\}$. Prove that
 - (1) X is a 4-dimensional manifold.
 - (2) X is diffeomorphic to $S^2 \times S^2$.

G&P, p. 32-33. # 5, # 9.

1. Let $f : \mathbf{R}^2 \rightarrow \mathbf{R}^2$ be given by $f(x, y) = (x^2 + x - 2y^2 + 1, -x^2 + y^2 + 3y - 2)$. Is the graph of f transversal to the set of all points in the form (x, x) (called the *diagonal*) in $\mathbf{R}^2 \times \mathbf{R}^2$?