

Homework 1, 18.994. Due Wed Sep 22nd

All problems worth 4 points except 2.6,16 which are worth 3. All homework sets will be worth the same amount unless otherwise indicated.

S=Spivak

S Chap 1: 10

S Chap 2: 1,4,6,16,24,29,30,32,39,

1. Suppose $f : \mathbb{R}^{(n+m)} \rightarrow \mathbb{R}^n$ is linear. Express the implicit function theorem for this case as a (familiar) statement about systems of linear equations.
2. Show that the system

$$3x + y - z + u^2 = 0 \quad (1)$$

$$x - y + 2z + u = 0 \quad (2)$$

$$2x + 2y - 3z + 2u = 0 \quad (3)$$

can be solved for x, y, u in terms of z , for x, z, u in terms of y , for y, z, u in terms of x but not for x, y, z in terms of u .

3. Set $f(x, y, z) = x^2y + e^x + z$. By considering f at $(0, 1, -1)$, show that there exists a diff'ble ftn g on a nbhd of $(1, -1)$ in \mathbb{R}^2 such that $g(1, -1) = 0$ and $f(g(y, z), y, z) = 0$.