Course 2E1 2005-06 (SF Engineers & MSISS & MEMS)

Sheet 9

Due: in the tutorial sessions next Wednesday/Thursday

Exercise 1

Minimize the function f subject to two constraints:

- (i) $f(x, y, z) = xyz^2$ on the intersection of $x^2 + y^2 1 = 0$ and y + z = 0;
- (ii) $f(x, y, z) = x^2 + y^2 + z^2$ on the intersection of y + z 2 = 0 and $y^2 4z^2 4x^2 = 0$.

Exercise 2

Use Taylor's formula to find linear and quadratic approximation at $(x_0, y_0) = (0, 0)$:

(i)
$$f(x, y) = xe^y$$
;
(ii) $f(x, y) = xy \cos y$;
(iii) $f(x, y) = \frac{x}{1-\sin y}$;

Exercise 3

Give error estimates for the linear approximations in Exercise 2 for

$$-0.1 \le x \le 0.1, \quad -0.2 \le y \le 0.2.$$