APL 771

Minor 1

All questions carry equal marks

The function $f(x_1, x_2) = (x_1^2 + x_2 - 11)^2 + (x_1 + x_2^2 - 7)^2$ is known as the Himmelblau function. Questions 1-4 below refer to this function.

1. Find a directional minimum in the first quadrant for the starting point x = (0,0) and the search direction (1,1).

2. Find the two-dimensional Taylor series expansion of the function about the point (0,0) which is accurate till the quadratic terms.

3. Beginning from the initial point (1,1) and $\Delta = (2,2)$, perform two iterations of Box's method.

4. With an initial simplex of x1 = (0,0) x2 = (2,0) and x3 = (1,1) and the parameters gam = 1.5, beta = 0.5, perform two iterations of the simplex method

5. For the function $f(x_1, x_2) = 6x_1^2 + 2x_2^2 - 6x_1x_2 - x_1 - 2x_2$ find the direction conjugate to the direction (0,1)