國立成功大學

工程科學學系

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數值方法

HW 10

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Using the following methods to solve the problem

$$10x_1 + 2x_2^2 - 3x_3 = 9$$

$$x_1^2 + 3x_2 - x_3^2 = -2$$

$$x_1 x_2 x_3 = 6$$

(a) Newton's method, (b) Broyden's method, (c) the steepest descent method, and (d) the Continuation method $N = 4$.

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(a) Newton's method solution:
    [x1 x2 x3]=  [1.16731 1.75111 2.93529]
    Residual=    [-1.77635684e-15  1.77635684e-15  8.88178420e-16]

(b) Broyden's method solution:
    [x1 x2 x3]=  [1. 2. 3.]
    Residual=    [8.41993142e-13 3.29691829e-12 1.20401467e-11]

(c) Steepest Descent solution:
    [x1 x2 x3]=  [1.17311 1.74244 2.93359]
    Residual=    [ 0.00250729 -0.00244394 -0.00353586]

(d) Continuation method (N=4) solution:
    [x1 x2 x3]=  [1. 1. 1.]
    Residual=    [ 0.  5. -5.]
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