

1. Use Newton's method to approximate a of the nonlinear system $0 = f_1(x_1, x_2) = x_1^2 - 2x_1 - x_2 + 1$ and $0 = f_2(x_1, x_2) = x_1^2 + x_2^2 - 1$.
 - (a) Find x_1 and x_2 by hand when $\vec{x}_0 = (1, 1)^T$.
 - (b) Write code to find x_4 when $\vec{x}_0 = (1, 1)^T$. Does the FPI converge? If so, to what?
 - (c) Find x_1 by hand when $\vec{x}_0 = (-6, 2)^T$. Use Numpy to approximate x_5 . Does the FPI converge? If so, to what?
 - (d) What goes wrong when the initial guess is $\vec{x}_0 = (0, 0)^T$?
2. Use Newton's method to approximate a of the nonlinear system $0 = f_1(x_1, x_2) = x_1^2 + x_2^2 - 1$ and $0 = f_2(x_1, x_2) = x_2 - x_1^3$.
 - (a) Find x_1 by hand when $\vec{x}_0 = (1, 2)^T$.
 - (b) Write code to find x_5 when $\vec{x}_0 = (1, 2)^T$. Does this FPI converge? If so, to what?
 - (c) Find x_1 by hand when $\vec{x}_0 = (2, 0)^T$. Use Numpy to approximate x_6 . Does this FPI converge? If so, to what?
3. textbook: 1, 2.