MA 8019: Numerical Analysis I – Homework #1

Name: **Student ID number:**

Consider the sequence $\{x_n\}$ defined by

$$x_{n+1} = x_n - (x_n^2 - 2)\left(\frac{x_n - x_{n-1}}{x_n^2 - x_{n-1}^2}\right),$$

with $x_1 = 2.0$ and $x_2 = 1.5$. Please write a MATLAB code to numerically show that the sequence converges to a number x^*. Also, numerically check that for $n = 2, 3, 4, 5$, the convergence is superlinear and find the order α.