Ross Miller

1. [0, 1]

Rearranging this function so that it becomes a fixed point problem we have

Dividing by three and taking the square root of both sides we have g(x) = which is a suitable equation for satisfying theorems 1 and 2 since g is continuos and g(x) ϵ [0,1] for all x ϵ [0,1] we know their exist at least 1 fixed point. Seeing that g’(x) = we find it has a k = .476, since k < 1 we now know the fixed point is unique. Calculating the number of iterations at E = 1e-4 and P0 = .5, we have 11.36256 so we should expect about 12 iterations to achieve an answer at the desired tolerance. Looking at the iterations we find this to be true with one less iteration then expected.

n | g(Pn-1) = Pn | Pn - Pn-1 | E

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001 0.7413 0.2413 1e-4

002 0.8364 0.0951 1e-4

003 0.8771 0.0407 1e-4

004 0.8952 0.0180 1e-4

005 0.9033 0.0081 1e-4

006 0.9070 0.0037 1e-4

007 0.9086 0.0017 1e-4

008 0.9094 0.0008 1e-4

009 0.9097 0.0003 1e-4

010 0.9099 0.0002 1e-4

011 0.9099 0.0001 1e-4