

The cubic $2x^3 + 3x^2 - 3x - 5 = 0$ has a root near $x = 1.2$.

(a) Show that this equation can be arranged into any one of the following forms suitable for fixed-point iteration:

(i)
$$x = \sqrt{\frac{3x+5}{2x+3}}$$

(ii)
$$x = \frac{(2x^3 + 3x^2 - 5)}{3}$$

Suggest a third alternative form suitable for fixed-point iteration.

[7]

(b) Use fixed-point iteration on the rearranged equation (i) with an initial guess of $x_0 = 1.2$ in order to find the root to 4 decimal places.

[5]

(c) Try a few iterations using rearrangement (ii). What goes wrong? Justify your explanation for the different behaviour in (i) and (ii).

[13]