**Question 3**

Incomplete answer

Marked out of 30

(*Bisection Method*). Prior to entering in the corresponding input fields, all numerical answers should be rounded to 6-digit floating-point numbers. Given a real number $z$, the symbol $\tilde{z}$ denotes the result of rounding of $z$ to a 6-digit floating-point number.

(i) Use the Bisection method to find an approximation $p_N$ of the unique solution $p$ the equation

$$3.64x(1 - x^2 + x)\ln(x) = x^2 - 1$$

in $[a, b] = [0.05, 0.5]$ such that

$$\mathrm{RE}(\tilde{p}_N \approx \tilde{p}_{N-1}) < 10^{-3}.$$

(iii) Show then your work by filling in the table that follows. In each input field in the column labelled by

$$f(a_n)f(p_n),$$

please enter either a plus sign + (if $f(a_n)f(p_n) > 0$), or a minus sign − (if $f(a_n)f(p_n) < 0$). If a particular row of the table is not necessary, enter an asterisk ∗ in each input field in the row. In order to calculate the relative error

$$\mathrm{RE}(\tilde{p}_1 \approx \tilde{p}_0)$$

in the first row, assume formally that $p_0 = 0.05$.

| $n$ | $a_n$ | $p_n$ | $b_n$ | $f(a_n)f(p_n)$ | $\mathrm{RE}(\tilde{p}_n$ |
|---|---|---|---|---|---|
| 1 | 0.05 | 0.275 | 0.5 | - | * |
| 2 | 0.05 | 0.1625 | 0.275 | - | 0.692308 |
| 3 | 0.05 | 0.10625 | 0.1625 | + | 0.529412 |
| 4 | 0.10625 | 0.134375 | 0.1625 | - | 0.209302 |
| 5 | 0.10625 | 0.120313 | 0.134375 | - | 0.116878 |
| 6 | 0.10625 | 0.113282 | 0.120313 | - | 0.0620663 |
| 7 | 0.10625 | 0.109766 | 0.113282 | + | 0.0320318 |
| 8 | 0.109766 | 0.111524 | 0.113282 | + | 0.0157634 |
| 9 | 0.111524 | 0.112403 | 0.113282 | + | 0.0078200 |
| 10 | 0.112403 | 0.112843 | 0.113282 | + | 0.0038992 |
| 11 | 0.112843 | 0.113063 | 0.113282 | + | 0.0019458 |
| 12 | 0.113063 | 0.113172 | 0.113282 | - | 0.0009631 |
| 13 | * | * | * | * | * |

As suggested in the previous problem, users of scientific calculators may first create a copy of the above table in an OpenOffice (or Excel) worksheet, and then copy-paste their answers.

(ii) According to your results in (i) and (ii),

$p_N \doteq$ [ 0.113172 ] .

**Please answer all parts of the question.**

[ Check ]

The submission was invalid, and has been disregarded without penalty.

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