**Numerical Analysis Assignment #3**

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2018112749 전현승

1. (5pt) Fill the following table to find a root of by Simple fixed-point method. Assume that the actual root of the given equation is 0.7686.

|  |  |  |  |
| --- | --- | --- | --- |
| iteration |  |  |  |
| 0 | 0.5 | - | 34.946656 |
| 1 | 0.649637 | 23.033933 | 15.477890 |
| 2 | 0.721524 | 9.963200 | 6.124929 |
| 3 | 0.750901 | 3.912282 | 2.302737 |

2. (5pt) Fill the following table to find a root of by Newton-Raphson method. Assume that the actual root of the given equation is 2.8601.

|  |  |  |  |
| --- | --- | --- | --- |
| iteration |  |  |  |
| 0 | 5 | - | 74.819062 |
| 1 | 3.424658 | 46.000000 | 19.739084 |
| 2 | 2.924357 | 17.108053 | 2.246670 |
| 3 | 2.861147 | 2.209255 | 0.036606 |

Secant method is an iterative method to find a root of a given equation as following:

However, an alternative approach to estimate the derivative involves a fractional perturbation of the independent variable to estimate as following:

, where is a small perturbation fraction such as step size. Therefore, this approximation can be substituted into the secant method approach as following:

We call this the modified secant method.

3. (5pt) Fill the following table to find a root of by the modified secant method with . Assume that the actual root of the given equation is 3.0467.

|  |  |  |  |
| --- | --- | --- | --- |
| iteration |  |  |  |
| 0 | 3.5 | - | 14.878393 |
| 1 | 3.199597 | 9.388784 | 5.018439 |
| 2 | 3.075324 | 4.040967 | 0.939507 |
| 3 | 3.048818 | 0.869377 | 0.069526 |