Small Group Exercise - The math behind the improvement

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Activity Kind

Small group exercise

Purpose

The purpose of this exercise is to further understand how to get the best performance from the Newton-Raphson method by verifying that it works.

Pre-requisite

Students are expected to have participated in:

- 10 Individual Research - Rate of convergence to a square root
- Small Group Exercise - Help each other complete the estimate for computing a million-digit square root of 2
- Small Group Exercise - Improving Newton-Raphson when values have many significant digits

Tasking

With your enhancement coded from the previous exercise, reimplement the experiment to compute the number of iterations required to produce a good square root for the value of 2E6. Rather than using an estimate of one half the input value, use the result from new estimation routine. Does this estimate eliminate the region where iteration after iteration yields no significant digits? Record your results in your ENB.

Try the routine with other really large and really small values. Is it the case that early iterations that produce no useful output in terms of significant digits has been solved by this new estimation? Explain!

Deliverable

Students are responsible for producing and posting their notes and their code in their ENB as evidence that they performed this task as required.

Submission

Each student must produce and submit your ENB for the day.