COMP526: Computational Methods for Scientists, Fall 2022
Assignment 5 - Due Friday 11/05/22

Under your home directory create a directory assign5. cd assign5.

Create your fortran 90 source file assign5.f90, in directory assign5.

Investigate in Wikipedia (under List of numerical analysis topics) and write your Fortran 90 code for:

In all cases use function

$$f(x) = e^x - 10x, \quad x \in [-1, 1].$$

- For root-finding algorithms use as initial iterate $x = 1$.
- For numerical integration and interpolation use $n = 5$.
- For Runge-Kutta and predictor-corrector use initial condition $x(-1) = e^{-1} - 5$.

Topics:

1. Farid: False position or regula falsi (read first Root-finding algorithms Wiki page)
2. Jenna: ITP (read first Root-finding algorithms Wiki page)
3. Hiro: Muller's method (read first Root-finding algorithms Wiki page)
4. Carlos: Secant method (read first Root-finding algorithms Wiki page)
5. Ben: Steffensen's method (read first Root-finding algorithms Wiki page)
6. Shuchi: Inverse quadratic interpolation (read first Root-finding algorithms Wiki page)
7. Audrey: Brent's method (read first Root-finding algorithms Wiki page)
8. Keerthan: Ridders' method (read first Root-finding algorithms Wiki page)
9. Shivani: Halley's formula (read first Root-finding algorithms Wiki page)
10. Harresh: Householder's method (read first Root-finding algorithms Wiki page)
11. Kshitij: Simpson's 3/8 rule (read first Numerical integration and Simpson's rule Wiki pages)
12. Vedika: Boole's rule (read first Numerical integration Wiki page)
13. Hayden: Tanh-sinh quadrature (read first Numerical integration Wiki page)
14. Amartya: Gauss-Konrod quadrature (read first Numerical integration Wiki page)
15. Mohsin: Chebyshev-Gauss quadrature (read first Gaussian quadrature Wiki page)
16. Thomas: Midpoint method (read first Runge-Kutta methods Wiki page)
17. Karthik: Heun's method (read first Runge-Kutta methods Wiki page)
18. Venkata: Bogacki-Shampine (read first Runge-Kutta methods Wiki page)
19. Monisha: Cash-Karp method (read first Runge-Kutta methods Wiki page)
20. Zachary: Dormand-Prince method (read first Runge-Kutta methods Wiki page)
21. Harshith: Runge-Kutta-Fehlberg method (read first Runge-Kutta methods Wiki page)
22. Devin: PECE (read first Predictor-Corrector method Wiki page)
23. Lukeman: Sigma approximation (read first Trigonometric interpolation Wiki page)