AER 336S: Problem 4

Please use fortran or C for this assignment. As always, submit a thoroughly commented source code. You may use the plotting package of your choice (matlab, if you wish) and must put your name on the figures.

Code up the classical fourth-order Runge-Kutta method and apply it to the ODE:

$$\frac{du}{dt} = \lambda u + a e^{\mu t}$$

with $\lambda = -1 + 5i$, $\mu = i$, $a = 10$, and $u(0) = 1$. Calculate the solution at $t = 2$ and determine the error by comparing with the exact solution. Produce a log-log plot of the error as a function of Δt and confirm that the results are fourth-order.