MATH 371-03 (181)
HW # 6
Due Nov. 11, 2018

Q1. Show that the fourth-order Runge-Kutta method when applied to the differential equation $y' = \lambda y$, can be written in the form

$$w_{i+1} = (1 + (h\lambda) + \frac{1}{2}(h\lambda)^2 + \frac{1}{6}(h\lambda)^3 + \frac{1}{24}(h\lambda)^4)w_i$$

Q2. Use Runge-Kutta method of order four first with $h = 0.1$ and then with $h = 0.2$ to obtain approximations to the solution of the initial-value problem

$$y' = -100ty^2, \quad 0 \leq t \leq 2, \quad y(0) = 2$$

The exact solution is $y = 2/(1 + 100t^2)$. Compare the stability for the different step sizes.