

MATH 319, Fall 2013, Assignment 4

Textbook Questions

Section 2.3, #3 A tank originally contains 100 gal of fresh water. Then water containing $1/2$ lb of salt per gallon is poured into the tank at a rate of 2 gal/min, and the mixture is allowed to leave at the same rate. After 10 min the process is stopped, and fresh water is poured into the tank at a rate of 2 gal/min, with the mixture again leaving at the same rate. Find the amount of salt in the tank at the end of an additional 10 minutes.

#5(a) A tank contains 100 gal of water and 50 oz of salt. Water containing a salt concentration of $(1/4)(1 + (1/2)\sin(t))$ oz/gal flows into the tank at a rate of 2 gal/min, and the mixture in the tank flows out at the same rate. Find the amount of salt in the tank at any time.

Section 2.7, #3(a,b) Consider the initial value problem $y' = 0.5 - t + 2y$, $y(0) = 1$. (a) Find approximate values of the solution of the given initial value problem at $t = 0.1, 0.2, 0.3$, and 0.4 using the Euler method with $h = 0.1$. (b) Repeat part (a) with $h = 0.05$. Compare the results with those found in (a).

Section 8.3, #3(a) Consider the initial value problem $y' = 2y - 3t$, $y(0) = 1$. Find approximate values of the solution at $t = 0.1, 0.2, 0.3$, and 0.4 using the Runge-Kutta method with $h = 0.1$. Compare with the exact solution.