

## Problem 5

A tank contains 100 gal of water and 50 oz of salt. Water containing a salt concentration of  $\frac{1}{4}(1 + \frac{1}{2} \sin t)$  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.

- (a) Find the amount of salt in the tank at any time.
- (b) Plot the solution for a time period long enough so that you see the ultimate behavior of the graph.
- (c) The long-time behavior of the solution is an oscillation about a certain constant level. What is this level? What is the amplitude of the oscillation?