

Problem 21

A pond initially contains 1,000,000 gal of water and an unknown amount of an undesirable chemical. Water containing 0.01 g of this chemical per gallon flows into the pond at a rate of 300 gal/h. The mixture flows out at the same rate, so the amount of water in the pond remains constant. Assume that the chemical is uniformly distributed throughout the pond.

- (a) Write a differential equation for the amount of chemical in the pond at any time.
- (b) How much of the chemical will be in the pond after a very long time? Does this limiting amount depend on the amount that was present initially?