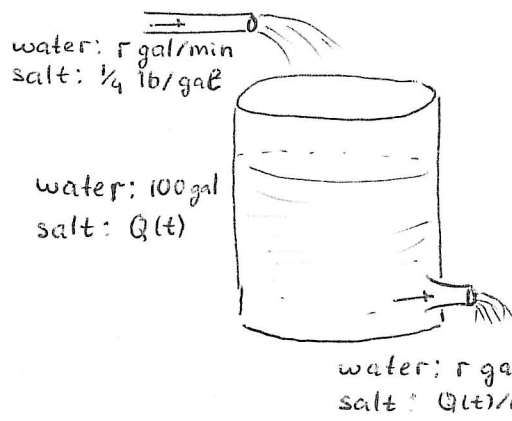


L4. First Order ODE : Applications.

Problem 1

At time $t=0$ a tank contains Q_0 lb of salt dissolved in 100 gal of water. Assume that



water containing $\frac{1}{4}$ lb of salt/gal is entering the tank at a rate of r gal/min and that the well-stirred mixture is draining from the tank at the same rate.

- ① Set up the initial value problem that describes the flow process. (for the amount of salt).
- ② Find the amount of salt $Q(t)$ in the tank at any time.
- ③ Find the limiting amount of salt Q_L in the tank
- ④ If $r=3$ and $Q_0=2Q_L$, find the time T after which the salt level is within 2% of Q_L .