

[gex5] First-order ODE: separation of variables II

A spherical drop of fluid with mass density ρ , initially of radius r_0 , shrinks at a rate proportional to its size. Find the radius of the drop as a function of time: $r(t)$ with $r(0) = r_0$.

(a) Assume that the mass decreases at a rate proportional to the surface area A of the drop as a result of evaporation: $dm/dt = -\alpha\rho A$.

(b) Assume that the mass decreases at a rate proportional to the volume of the drop as a result of some kind of some chemical instability: $dm/dt = -\beta\rho V$.

Solution: