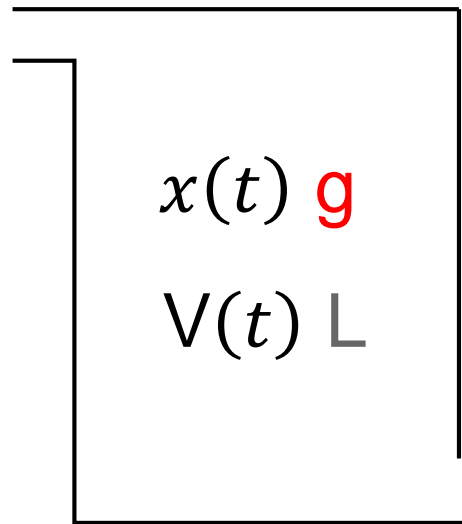
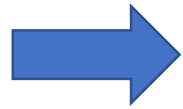


Mezclas Químicas

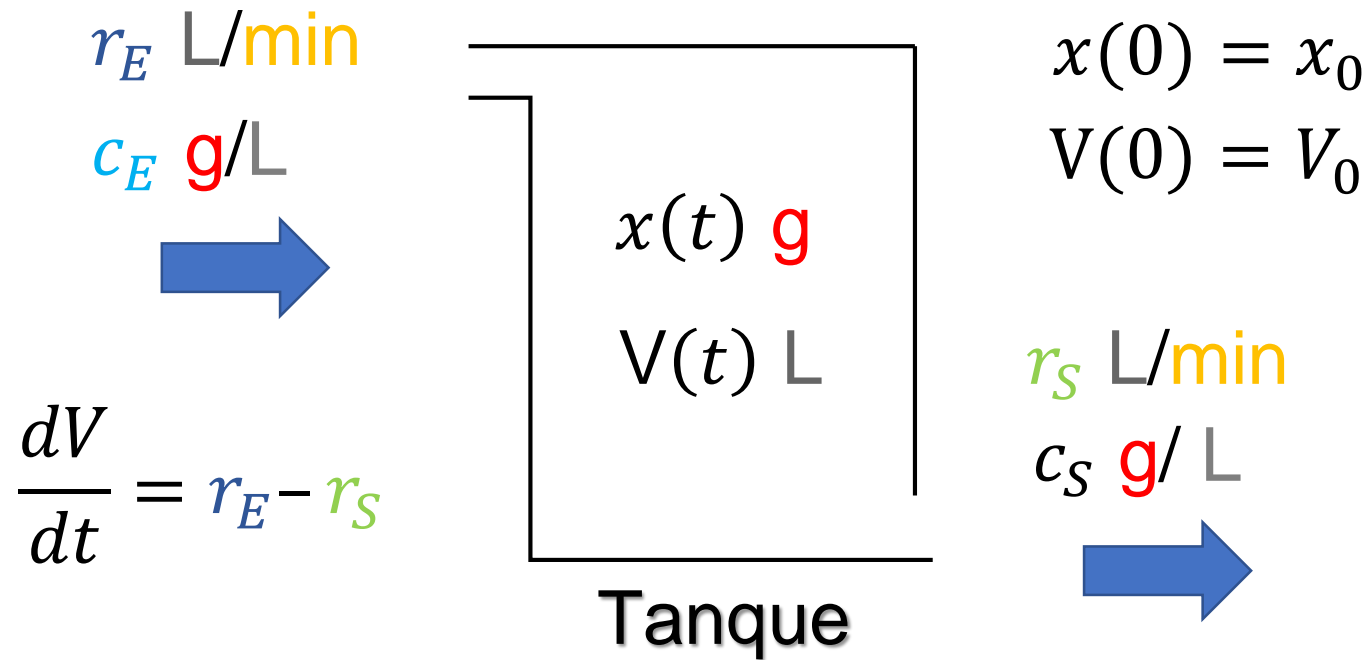
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r_E L/min c_E g/L

Tanque

 $x(0) = x_0$ $V(0) = V_0$ r_S L/min c_S g/L



$$\frac{dV}{dt} = r_E - r_S$$

$$\int \frac{dV}{dt} dt = \int r_E - r_S dt$$

Observación: Método
de variables separables

$$\frac{dV}{dt} = r_E - r_S$$

$$\int \frac{dV}{dt} dt = \int r_E - r_S dt$$

$$V = (r_E - r_S)t + C$$

Observación: Método
de variables separables

$$\frac{dV}{dt} = r_E - r_S$$

$$V(0) = V_0$$

$$\int \frac{dV}{dt} dt = \int r_E - r_S dt$$

$$V = (r_E - r_S)t + C$$

Luego

$$V(0) = (r_E - r_S) \cdot 0 + C = V_0$$

$$\frac{dV}{dt} = r_E - r_S$$

$$V(0) = V_0$$

$$\int \frac{dV}{dt} dt = \int r_E - r_S dt$$

$$V = (r_E - r_S)t + C$$

Luego

$$V(0) = (r_E - r_S) \cdot 0 + C = V_0$$

$$C = V_0$$

$$\frac{dV}{dt} = r_E - r_S$$

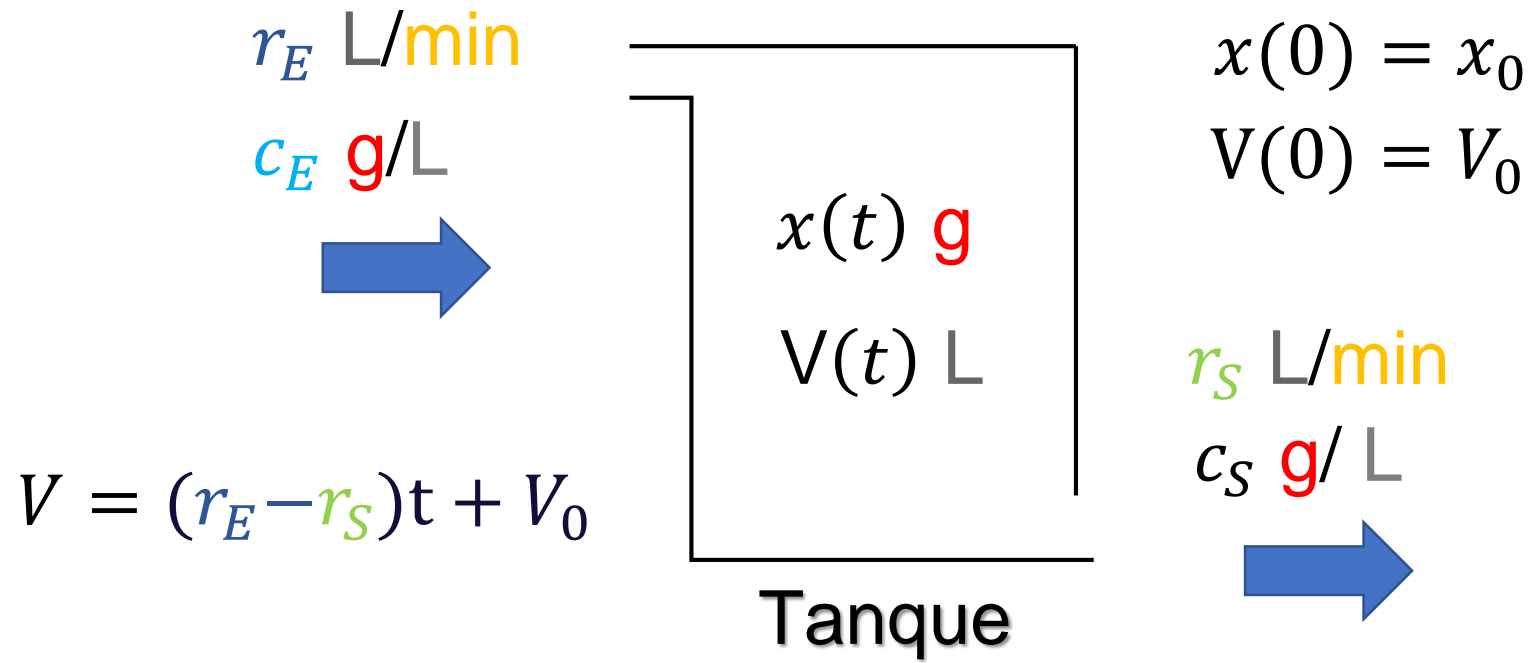
$$V(0) = V_0$$

$$\int \frac{dV}{dt} dt = \int r_E - r_S dt$$

$$V = (r_E - r_S)t + C$$

Por lo tanto

$$V = (r_E - r_S)t + V_0$$



c_s g/ L

$$c_s = \frac{x(t)}{V(t)}$$

Observación:

**Concentración =
cantidad/Volumen**

$$V = (r_E - r_S)t + V_0$$

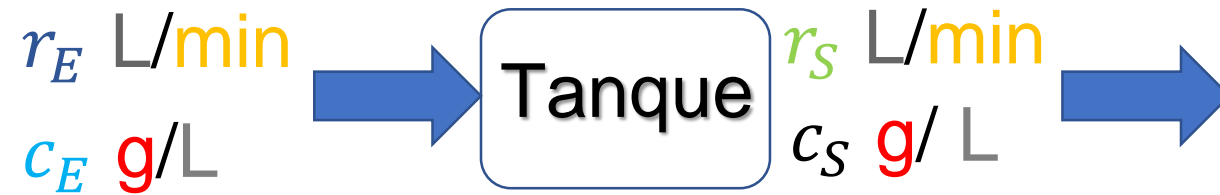
Observación:

**Concentración =
cantidad/Volumen**

$$c_s = \frac{x(t)}{V(t)}$$

$$c_s = \frac{x(t)}{(r_E - r_S)t + V_0}$$

Principio de las Mezclas



$$x(0) = x_0$$

$$V(0) = V_0$$

$$c_S = \frac{x(t)}{(r_E - r_S)t + V_0}$$

Principio de las Mezclas



$$x(0) = x_0$$

$$V(0) = V_0$$

$$c_S = \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$\frac{dx}{dt} = E - S$$

$$\frac{dx}{dt} = E - S$$

Observación:

$$r_E \text{ L/min} \quad c_E \text{ g/L}$$

$$r_S \text{ L/min} \quad c_S \text{ g/L}$$

E = cantidad de sustancia que entra por minuto
 $= r_E \cdot c_E \text{ g/min}$

S = cantidad de sustancia que sale

$$\frac{dx}{dt} = E - S$$

Observación:

$$r_E \text{ L/min} \quad c_E \text{ g/L}$$

$$r_S \text{ L/min} \quad c_S \text{ g/L}$$

E = cantidad de sustancia que entra por minuto
 $= r_E \cdot c_E \text{ g/min}$

S = cantidad de sustancia que sale

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot c_S$$

$$\frac{dx}{dt} = E - S$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot c_S$$

Observación:

$$c_S = \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$\frac{dx}{dt} = E - S$$

Observación:

$$c_S = \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot c_S$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$\frac{dx}{dt} = E - S$$

Observación:

$$\frac{dx}{dt} = x' \quad x(t) = x$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot c_S$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$x' = r_E \cdot c_E - r_S \cdot \frac{x}{(r_E - r_S)t + V_0}$$

$$\frac{dx}{dt} = E - S$$

Observación:

$$\frac{dx}{dt} = x' \quad x(t) = x$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot c_S$$

$$\frac{dx}{dt} = r_E \cdot c_E - r_S \cdot \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$x' = r_E \cdot c_E - r_S \cdot \frac{x}{(r_E - r_S)t + V_0}$$

$$x' + r_S \cdot \frac{x}{(r_E - r_S)t + V_0} = r_E \cdot c_E$$

Principio de las Mezclas



$$x(0) = x_0$$

$$V(0) = V_0$$

$$c_S = \frac{x(t)}{(r_E - r_S)t + V_0}$$

$$x' + r_S \cdot \frac{x}{(r_E - r_S)t + V_0} = r_E \cdot c_E$$

Créditos

Vicerrectoría de Docencia

CEDA-TEC Digital

Proyecto de Virtualización 2018

Ecuaciones Diferenciales

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