ERQ II – P1 Modelo 1

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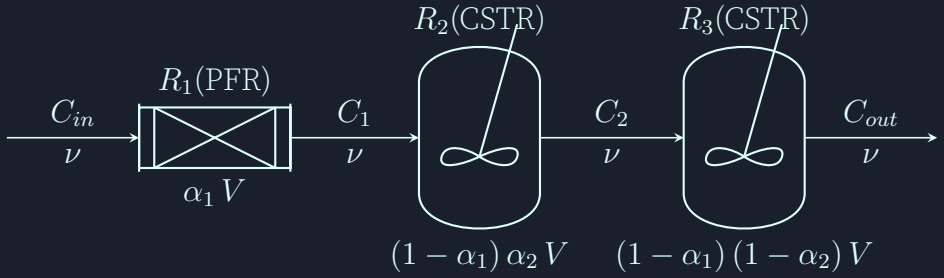
Conteúdo

1 Modelo


R_2(CSTR)
R_3(CSTR)
R_1(PFR)
C_{in}
ν
C_1
ν
C_2
ν
C_{out}
ν
$\alpha_1 V$
$(1-\alpha_1)\,\alpha_2 V$
$(1-\alpha_1)\,(1-\alpha_2)\,V$

Calculos

1.1 C2

$$\boldsymbol{C_{2,i+1} = C_{2,i} + \frac{C_{1,i} - C_{2,i}}{(1-\alpha_1)\,\alpha_2\,\tau}\,\Delta t}$$

$$\begin{aligned}
&\nu\, C_1 = \nu\, C_2 + (1-\alpha_1)\,\alpha_2\, V\, \frac{\mathrm{d}C_2}{\mathrm{d}t} \implies \\
&\implies C_1 = C_2 + (1-\alpha_1)\,\alpha_2\,\tau\, \frac{\mathrm{d}C_2}{\mathrm{d}t} \implies \\
&\implies \frac{\mathrm{d}C_2}{\mathrm{d}t} = \frac{C_1 - C_2}{(1-\alpha_1)\,\alpha_2\,\tau} \implies \\
&\implies \frac{\Delta C_2}{\Delta t} = \frac{C_{2,i+1} - C_{2,i}}{\Delta t} = \frac{C_{1,i} - C_{2,i}}{(1-\alpha_1)\,\alpha_2\,\tau} \implies \\
&\implies C_{2,i+1} = C_{2,i} + \frac{C_{1,i} - C_{2,i}}{(1-\alpha_1)\,\alpha_2\,\tau}\,\Delta t
\end{aligned}$$

1.2 C out

$$\boldsymbol{C_{out,i+1} = C_{out,i} + \frac{C_{2,i} - C_{out,i}}{(1-\alpha_1)(1-\alpha_2)\,\tau}\,\Delta t}$$

$$\nu\, C_2 = \nu\, C_{out} + (1-\alpha_1)(1-\alpha_2)\, V\, \frac{\mathrm{d}C_{out}}{\mathrm{d}t} \implies$$

$$\implies C_2 = C_{out} + (1-\alpha_1)(1-\alpha_2)\,\tau\, \frac{\mathrm{d}C_{out}}{\mathrm{d}t} \implies$$

$$\implies \frac{\mathrm{d}C_{out}}{\mathrm{d}t} = \frac{C_2 - C_{out}}{(1-\alpha_1)(1-\alpha_2)\,\tau} \implies$$

$$\implies \frac{\Delta C_{out}}{\Delta t} = \frac{C_{out,i+1} - C_{out,i}}{\Delta t} = \frac{C_{2,i} - C_{out,i}}{(1-\alpha_1)(1-\alpha_2)\,\tau} \implies$$

$$\implies C_{out,i+1} = C_{out,i} + \frac{C_{2,i} - C_{out,i}}{(1-\alpha_1)(1-\alpha_2)\,\tau}\,\Delta t$$