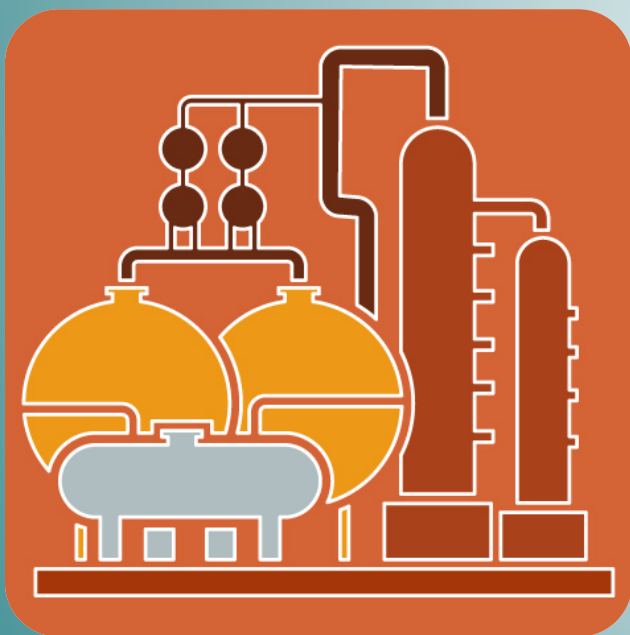


# Chemical Process Design / Diseño de Procesos Químicos

## Topic 4.6. Reactor



**Javier R. Viguri Fuente**  
**Eva Cifrian Bemposta**

Department of Chemistry and Process & Resource Engineering  
GER Green Engineering and Resources Research Group

This work is published under a License:

[Creative Commons BY-NC-SA 4.0](https://creativecommons.org/licenses/by-nc-sa/4.0/)

## 4.- Development of Linear Mass Balance (LMB) models

$\eta$  eta

$\gamma$  gamma

$\mu$  mi

### 4.3. Reactor

Simple model that assumes  
fixed conversion



**Given:**

a) NR Chemical Reactions:  $r = 1, \dots, NR$ .

b) Stoichiometric coefficients for each  $k$  in each reaction  $\gamma_{r,k}$  with the convention:

$$\gamma_{r,k} \begin{cases} > 0 \text{ Product.} \\ < 0 \text{ Reactive.} \\ = 0 \text{ Inert.} \end{cases}$$

c) Conversion per pass  $\eta_r$  with respect to limiting reactant  $l(r)$  in the feed.

d) The convection when  $k = l(r)$ ,  $\gamma_{r,l(r)} = -1$

$$\mu_R^k = \mu_i^k + \sum_{r=1}^{NR} \gamma_{r,k} \eta_r \mu_{in}^{l(r)} \quad \text{For all } k.$$