

## Agglomeration solver Fixed Pivot

### General description

Performs calculation of the agglomeration process in form of birth  $B_{agg}(n, v, t)$  and death  $D_{agg}(n, v, t)$  terms using a fixed pivot technique:

$$\frac{\partial n(v, t)}{\partial t} = B_{agg}(n, v, t) - D_{agg}(n, v, t),$$

$$B_{agg}(n, v, t) = \frac{1}{2} \beta_0 \int_0^v \beta(u, v-u) n(u, t) n(v-u, t) du,$$

$$D_{agg}(n, v, t) = \beta_0 n(v, t) \int_0^\infty \beta(u, v) n(u, t) du$$

- $v$  and  $u$  are volumes of agglomerating particles
- $n(v, t)$  is the number density function
- $B_{agg}(n, v, t)$  and  $D_{agg}(n, v, t)$  are the birth and death rates of particles with volume  $v$  caused due to agglomeration
- $\beta_0$  is the agglomeration rate constant, dependent on operating conditions but independent from particle sizes
- $\beta(v, u)$  is the agglomeration kernel describing the agglomeration frequency between particles of volumes  $v$  and  $u$ , which produce a new particle with the size  $(v + u)$
- $t$  is time

### Requirements

- Solid phase
- Particle size distribution

### References

*S. Kumar, D. Ramkrishna, On the solution of population balance equations by discretization – I. A fixed pivot technique. Chem. Eng. Sci. 51 (8) (1996) 1311-1332.*