

Szego, Sandor; Cinnella, Pasquale; Cunningham, Al B.

Numerical simulation of biofilm processes in closed conduits. (English) Zbl 0791.76067

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The study details the derivation and application of a finite-volume-based methodology to the simulation of biofilm processes in axisymmetric reactors. Multiple space scales, ranging from the micron to the meter, and multiple time scales, ranging from the second to the day, are resolved. Unsteady problems are considered, where diffusion and biochemical reactions are the dominant physical phenomena. Moreover, moving boundaries such as the interface between biofilm and bulk liquid are accounted for.

MSC:

76M25 Other numerical methods (fluid mechanics) (MSC2010)

76Z99 Biological fluid mechanics

92C10 Biomechanics

Keywords:

multiple space scales; finite-volume-based methodology; axisymmetric reactors; multiple time scales; diffusion; moving boundaries

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