# Teaching Non-Ideal Reactors with CFD Tools

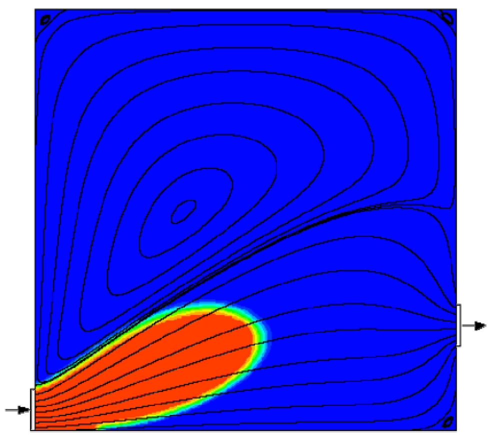
## Picture Gallery

The following pictures illustrate the concentration evolution of a tracer inside the reactor. Initially, the reactor is full of **water** (**blue**), and a step profile in the concentration of a **tracer** (**red**) is imposed at the inlet boundary. The reduced time is defined as $\theta = t/\tau$, where $\tau$ represents the space-time.

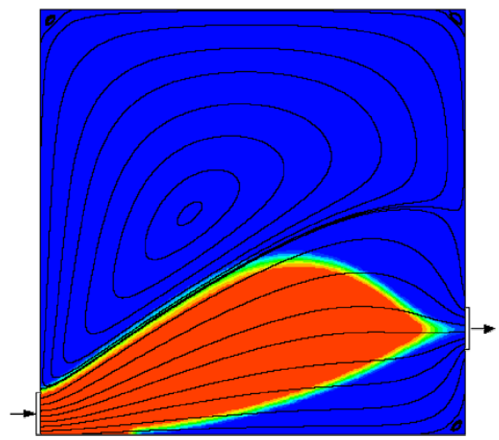
The **streamlines** are shown in **black**.

### *L*/*H*=1 *Re*=10

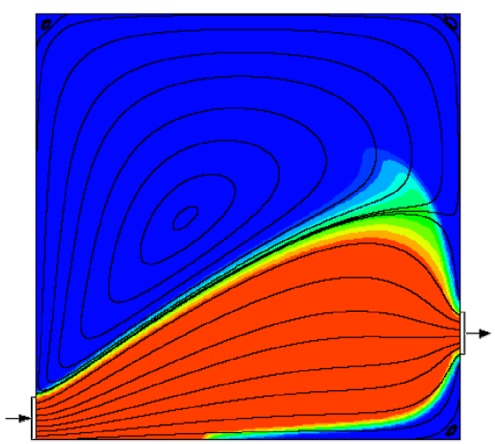
$\theta = 0.1$



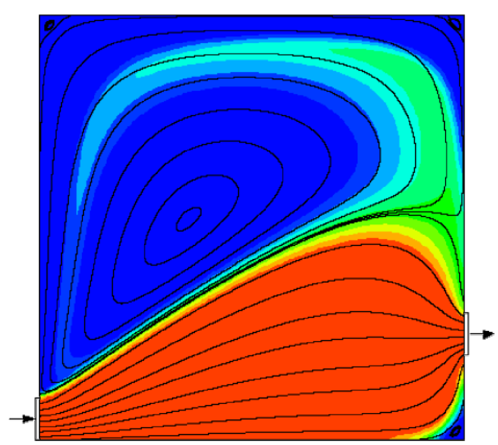
$\theta = 0.22$



$\theta = 1$



$\theta = 5$



These pictures clearly illustrate that approximately at $\theta = 0.22$ one starts to 'see' tracer at the reservoir outlet. In addition, even for a very long time of operation (about 5 times the residence time), the reservoir is not completely full of tracer, due to the large stagnant zone.

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Now, we illustrate the steady-state concentration field of a **reagent** (orange) which undergoes a 1st-order irreversible reaction, originating a **product** species (green). The influence of the Damkholer number, *Da* = $k\tau$, is illustrated.