Efficient Modeling of the detailed MWD under complex flow effects

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Polymerization processes are sensitive to conditions such as temperature and pressure, which greatly changing the MWD (molecular weight distribution) of polymer. This distribution is directly related to the physical properties, i.e., the quality of the product, so the ability to predict the polymer MWD under the applicable operating conditions is essential for controlling the polymer process. Until recently, various studies have been conducted to obtain detailed MWD, but many models have simplified at least one of the two areas, flow dynamics and polymer distribution, since complex operations were required to simultaneously consider both. To overcome these limitations, this study aims to convert moment from MoM (Method of Moment) into PGF (Probability Generating Functions) to efficiently obtain detailed MWD. This allows to use the CFD data of an actual reactor to simulate the complex flow and obtain the spatial distribution of properties. The developed model deals with the flow of autoclave reactor, which is industrially used for polymer production, as a multicompartment model, and EVA copolymerization as a reaction system to compare it with experimental results.