**121d A Local Transient Approach to Monitoring Fluidization Quality**

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A fundamental question in dynamical systems research is this: How does the local dynamic behavior relate to the global dynamic behavior of a system? Fluidized bed reactors are complex dynamic systems well-suited to aid in answering this question. Fluidization research has traditionally relied upon global and time-averaged measurement techniques such as pressure drop. In contrast, this work explores the rich source of information contained in local transient measurements of fluidized beds. Specifically the objective of this research is to relate the dynamic behavior of the local transient solids fraction to key flow parameters – mean particle size and superficial gas velocity.

In order to study the local fluid bed dynamics, needle-type capacitance probes were employed to gather local transient solids fraction data in a bench-scale bubbling bed. The time-series were then subject to analysis in order to extract various signal invariants. The parametric effects of axial measurement location, superficial gas velocity, and mean particle size were examined in order to identify favorable heuristic trends in the signal invariants with respect to global parameters governing fluidization quality (i.e., superficial gas velocity and mean particle size). This work demonstrates how these invariants then constitute the basis for a novel regime-map based monitoring scheme for quality of fluidization with potential application to feedback control.