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Inlet Jet Interaction in Horizontal Pipe Flow[1] PRANAB JHA, Dept. of Mechanical Engineering, University of Houston, CHUCK SMITH, Apache Corporation, RALPH METCALFE, Dept. of Mechanical Engineering, University of Houston — Laminar incompressible flow (Re $<$ 1000) inside a horizontal channel with multiple cross-flow inlets was studied numerically. First, two cross-flow inlets were used to observe the flow interference phenomenon between the inlets. This concept was extended to axisymmetric pipe flow with five cross-flow inlets. Three basic flow regimes - trickle flow, partially blocked flow and fully blocked flow - were identified with respect to the blocking of upstream inlets by the downstream ones. The effects of inlet pressure and different inlet sizes on the flow regimes under steady state condition were studied. A hydrostatic model of fluid reservoirs draining into the channel was constructed using a linear function for pressure at the inlet boundaries to study the dynamic behavior of the inlets. Three different time scales related to the depletion of the reservoirs were identified. The dynamic behavior of two cross-flow inlets was observed with the initial conditions corresponding to the three flow regimes. Similar study was carried out for a five-inlet case and the dynamic behavior of individual reservoirs was observed. The change of flow regimes in the system over time with reservoir draining was evident and the different time-scales involved were identified.

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