

Abstract Submitted
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An ensemble method for targeted adaptive observations applied to multiphase flows¹ ZHIZHAO CHE, FANGXIN FANG, JAMES PERCIVAL, GEOFFREY HEWITT, CHRISTOPHER PAIN, OMAR MATAR, Imperial College London, MICHAEL NAVON, Florida State University — Many flow problems, such as turbulence and multiphase, are extremely complex due to their strong nonlinearity. It is important to simulate and measure different parameters accurately, such as pressure drops and flow rates, to which flow phenomena are very sensitive. Therefore, it is essential to put the sensors at the locations with larger impact, and to avoid locations with lower impact. Here, we proposed an ensemble method to estimate the impact of observations at different locations. Ensembles were generated by adding perturbations to the initial conditions, say. Different target functions were used to quantify the impact of observations. In comparing with other methods for estimating impact, this ensemble method is very simple to implement, and is independent of the definition of the target functions. This method is demonstrated by applying it to the one-dimensional Burgers equation. The next steps are to extend this method to various complex problems such as multiphase flows.

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