Abstract

Sequential model calibration using nested particle filters

Recent advances in sensor technologies allow for the creation of (quasi-)real-time groundwater models. The pursuit of reliable predictions encourages the application of sequential model calibration algorithms, improving model parameters one set of observations at a time. Current state-of-the-art, the ensemble Kalman filter (EnKF), fails at reproducing parameter sets consistent with local geology, is highly sensitive to system misspecifications, and requires restrictive assumptions routinely violated in practice. Nested particle filters may provide a promising alternative by allowing for the introduction of an arbitrary, artificial parameter dynamic. Although the filter repeatedly collapses we obtain a powerful parameter optimizer related to evolutionary algorithms.