Title: Data-assimilated computational fluid dynamics modeling of convection-diffusion-reaction problems

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Dear Editor:

The highlights of the present paper "Data-assimilated computational fluid dynamics modeling of convection-diffusion-reaction problems" include the following aspects.

- This study is an early attempted to apply data assimilation technique to computational fluid dynamics (CFD) modeling of combustion in engineering science. Data assimilation originated from meteorology and has had a dramatic impact in weather forecasts. Inspired by its success in improving weather predictions, this study explores and applies data assimilation to improve predictive capabilities of combustion physics in engineering science.

- This work builds a transformative and versatile data-assimilated-CFD framework that employs ensemble Kalman filter algorithm for model parameter estimation, and thus improves CFD predictions.

- This study demonstrates the validity and effectiveness of the multi-algorithm for solving problems involving convection, diffusion, and reaction on engineering scales.

- This investigation provides insights on the role, the reliability, and the nonlinear interaction of the data during the assimilation process by using a flame propagation problem. This work has laid a solid foundation for future applications of the data assimilation to CFD modeling of combusting flows in engineering devices.

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