Field Sensitivity of Flow Predictions to Rheological Parameters

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Highlights

- A formulation is developed for efficiently computing the spatially dependent sensitivity of a quantity of interest in a flow to the parameters of a rheological model for the fluid.
- It is demonstrated for multiple rehological models.
- It is shown how the field sensitivity can be used for (1) quantifying the relative importance of different underlying physical mechanisms, (2) for directing rheological characterization to improve fidelity for a particular prediction, (3) for inferring rheological properties from indirect measurements, and (4) in aiding the design of fluids to meet objectives.