

# Preparing physics components for implicitly coupled multiphysics

- 1) Mollify artifactual nondifferentiability in each component (e.g., limiters, parameter switches)
- 2) Check that there are no Monte Carlo features
- 3) Identify spatial and temporal and truncation errors of each component
- 4) Unhide “hidden” state variables (e.g., COMMON)
- 5) Produce input state to output residual map to get the (possibly distributed) action of a global discrete residual of governing and coupling equations
- 6) Verify accuracy and robustness of physical parameters, especially those based on homogenization with hidden assumptions with respect to spatial and temporal resolution
- 7) Consider nondimensionalization for superior scaling in floating point arithmetic