Title: Enhancing spatial filters: VMS-filters and parameter optimization

Speaker: Maria Strazzullo (Polito)

Abstract: The evolve-filter (EF) model is a filter-based numerical stabilization technique for convection-dominated flows in under-resolved regimes. EF provides a simple, modular, and effective approach for simulations, however, it is well-known that when the filter radius is too large, EF can become overly diffusive with inaccurate outcomes.

In this talk, we introduce a novel approach to mitigate the overdiffusivity of EF when using a large filter radius. We employ the variational multiscale (VMS) framework to separate the large resolved scales from the small resolved scales in the evolved velocity field, using the filtered small scales to correct the large scales.

These new VMS-based algorithms yield to more accurate results than the standard EF approach in both FOM and ROM simulations of flow around a cylinder at a Reynolds number 1000.