Domain decomposition-based coupling of intrusive and non-intrusive reduced order models via the Schwarz alternating method

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This talk will describe a novel domain decomposition-based approach for creating adaptive hybrid models with the help of the Schwarz alternating method (SAM). In this approach, the solution on the full domain is obtained via an iterative process in which a sequence of subdomain-local problems are solved, with information propagating between subdomains through transmission boundary conditions (BCs). The models being coupled can be subdomain-local full order models (FOMs) and/or subdomain-local intrusive or non-intrusive reduced order models (ROMs). We will present some recent extensions of SAM to enable the coupling of subdomain-local non-intrusive ROMs constructed via Operator Inference (OpInf). We will show numerical results that demonstrate the method's performance on several benchmarks. We will additionally discuss some perspectives towards enabling on-the-fly switching between subdomain-local models of varying fidelities within the SAM framework.