1154-65-412 **Pavel B Bochev*** (pbboche@sandia.gov), MS 1320, Albuquerque, NM 87185, and **Paul Kuberry** and **Kara Peterson**. *Explicit Partitioned Methods based on Monolithic Formulations of the Coupled Problem.*

Traditional explicit partitioned schemes exchange boundary conditions between subdomains and are related to iterative methods for the coupled problem. Thus, they may require multiple subdomain solves, acceleration, or optimized transmission conditions to be accurate and stable.

We present new synchronous partitioned methods derived from a monolithic formulation of the coupled problem in which the transmission condition is enforced by a Lagrange multiplier. We transform the resulting Differential Algebraic Equation (DAE) to a Hessenberg index-1 form in which the algebraic equation defines the Lagrange multiplier as an implicit function of the states.

We eliminate the multiplier and reduce the DAE to a system of ODEs for the states. Explicit time integration both discretizes this system in time and decouples it. Thus, temporal accuracy and stability of our formulation are governed solely by the accuracy and stability of the explicit scheme and are not subject to additional stability considerations.

We establish sufficient conditions for the formulation to be well-posed and prove that mortar finite elements are stable for the Lagrange multiplier. We show that in this case the condition number of the Schur complement is bounded by a constant. (Received September 03, 2019)