

PARTITIONED PENALTY METHOD FOR CONTAMINANT TRANSPORT MODELS IN COUPLED GROUNDWATER-SURFACE WATER FLOWS

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ABSTRACT. Partitioned methods uncouple models for surface-water with groundwater flows into subdomain, subphysics solves. The resulting (Stokes-Darcy) fluid velocity is important because the flow transports contaminants. The numerical analysis and algorithm development for the evolutionary Stokes-Darcy-transport problem has, however, focused on a quasi-static Stokes-Darcy model and a single domain (fully coupled) formulation of the transport equation. We present a numerical analysis of a partitioned method for contaminant transport for the fully evolutionary system. The algorithm studied is unconditionally stable and requires only one subdomain solve per step.

Keywords: Stokes-Darcy, transport, quasi-static, partitioned method, penalty method

Mathematics Subject Classifications (2010): 65M12

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