DVS Algebraic Developments and Critical Implementation Routes

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Abstract

The outstanding parallelization efficiencies that DVS-software has achieved are the result of several positive features, which were carefully sought and cultivated during its development. On one hand, the introduction of discretization methods that eliminate nodes of multiplicity greater than one, as *non-overlapping discretization methods* do, permitted separating thoroughly the operations carried out by different processors; the use of an axiomatic approach yielded remarkable generality supplying a broad range of applicability to *DVS-software* that is being materialized with the help of suitable interphases; and the introduction of a simplified -but precise and general- notation together with a systematic, and general algebraic structure permits identifying in an easy manner the most efficient routes to minimize communications and optimize performance. As its title indicates, in this talk we dwell on the simplified notation, general algebraic structure and algebraic relations specifically constructed for the development of the (Derived-Vector Space) DVS methodology and software.

Key Words: Parallel Software for PDEs, DVS-software, HPC, Parallel Computing, Domain Decomposition Methods (DDM), Numerical linear algebra, Computational engineering programming

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