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*Involutive completion for constrained PDE systems*

We propose to use the involutive form of the system of PDEs in numerical computations.

We illustrate our approach by applying it to Stokes system. As in case of the solution of differential algebraic equations our approach takes explicitly into account the integrability conditions of the system which are only implicitly present in the original formulation. The extra calculation cost is negligible while the discrete form becomes much simpler to handle. One interesting consequence is that the discretization need not verify the classical LBB stability condition.

The approach is very general and can be useful for a wide variety of systems not as well known as fluid flow equations.

The application of the approach to various PDE systems under constraint will be presented together with numerical examples.