Domain decomposition for nonlinear parabolic problems in a variational framework

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Nonlinear parabolic equations are frequently encountered in applications, but in practice constructing an approximation for these problems yields a large scale computational system. In order to obtain an efficient algorithm for the numerical approximation, it can be useful to apply a scheme that consists of a number of independently solvable subproblems to make use of a parallel computing hardware.

In our work, we introduce a general framework of non-autonomous, inhomogeneous evolution equations in a variational setting and show convergence of an operator splitting scheme via a time discretization. This approach covers a fairly general class of parabolic differential equations. We exemplify the usage to a p-Laplacian type problem with a possibly time depending domain decomposition.