Product formulas for operator matrix semigroups

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Many systems in physics, biology or engineering can be described by an abstract Cauchy problem on a product Banach space. Unfortunately, unbounded operators on product spaces are in general difficoult to represent as "matrix" operators.

It is also a big problem in applications that complicated systems can be solved directly usually at high cost. The idea of operator splitting is to split the problem into simple sub-problems and then use a product formula to represent the solutions.

In this talk, we present easy to verify conditions implying stability estimates for operator matrix splittings which ensure convergence of the associated Trotter, Strang and weighted product formulas. The results are applied to inhomogeneous abstract Cauchy problems and to boundary feedback systems.

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