ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

15. Numerical Analysis and Scientific Computing

1991 MS Classification: 65
González, C., and & C. Palencia, Departamento de Matemática Aplicada y Computación, Universidad de Valladolid, Spain

The implicit Euler method for abstract time-dependent parabolic problems with variable domains

Let $A(t) : D(A(t)) \subset X \to X$, $0 \leq t \leq T$, be a family of linear operators in a Banach space X. For any individual $t \in [0,T]$ the operator $A(t)$ is assumed to generate an analytic semigroup $e^{sA(t)}$, $s \geq 0$. The domains $D(A(t))$ are allowed to depend on $0 \leq t \leq T$. Stability properties of the semidiscretizations in time of the initial value problem

$$u'(t) = A(t)u(t), \quad 0 \leq t \leq T; \qquad u(0) = u_0 \in X,$$

are studied. For simplicity, the attention is restricted to the case of the implicit Euler method. The problem is fitted in a new framework that affords for such a stability study and that covers many of the classical parabolic problems. Extrapolation spaces are not required in the present approach.