

Generators with a closure relation

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Suppose that a block operator of the form $\begin{pmatrix} A_1 & \\ & A_2 \end{pmatrix}$, acting on the Banach space $X_1 \times X_2$, generates a contraction C_0 -semigroup. We show that the operator A_S defined by $A_S x = A_1 \begin{pmatrix} x \\ S A_2 x \end{pmatrix}$ with the natural domain generates a contraction semigroup on X_1 . Here, S is a boundedly invertible operator for which $-S^{-1} + \epsilon I$ is dissipative for sufficiently small ϵ . With the result the existence and uniqueness of solutions of the heat equation can be derived from the wave equation.