Approximation and convergence of forms

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Let H be a complex Hilbert space. For all $n \in \mathbb{N}$ let a_n be a densely defined sectorial form in H and let A_n be the associated m-sectorial operator. Further, let a be a densely defined sectorial form in H with associated m-sectorial operator A. Suppose that the sequence $(a_n)_{n\in\mathbb{N}}$ of forms converges in some sense to the form a, does it follow that the m-sectorial operators converge to A in some sense? Or that the semigroups converge?

First results for closed positive symmetric forms were proved by Kato and Simon [Kat], [Sim] for convergence to a from above or below. These theorems have been extended to sectorial forms which are not necessarily closed [AE], [BE].

In this project we wish to study these proofs in detail and if possible find new cases.

References

[AE] Arendt, W. and Elst, A. F. M. ter, Sectorial forms and degenerate differential operators. *J. Operator Theory* **67** (2012), 33–72.

[BE] Batty, C. J. K. and Elst, A. F. M. ter, On series of sectorial forms. *J. Evol. Equ.* **14** (2014), 29–47.

[Kat] Kato, T., *Perturbation theory for linear operators*. Second edition, Grundlehren der mathematischen Wissenschaften 132. Springer-Verlag, Berlin etc., 1980.

[Sim] Simon, B., A canonical decomposition for quadratic forms with applications to monotone convergence theorems. *J. Funct. Anal.* **28** (1978), 377–385.