Domination in Krein Spaces

M. Wojtylak

Let the operator A be symmetric in a Krein space $\mathcal{K}$, and let $(S_n)_{n=0}^{\infty} \subseteq \mathbf{B}(\mathcal{K})$ be a sequence tending to $I_{\mathcal{K}}$ in the weak operator topology. Our main result says that if the operators $S_n A - AS_n$ and AS_n^+ are densely defined for $n \in \mathbb{N}$ and

$$\sup_{n\in\mathbb{N}} \|AS_n - S_n A\| < +\infty$$

then A is selfadjoint in $\mathcal{K}$. We consider various examples of the sequence $(S_n)_{n=0}^{\infty}$. For instance, we take $S_n = (-z_n)^m (S - z_m)^{-m}$, where S is a selfadjoint operator such that S^m dominates A, i.e. $\mathcal{D}(S^m) \subseteq \mathcal{D}(A)$. In this way we generalize some results from [1] onto Krein spaces and also obtain a new criteria for selfadjointness in a Hilbert spaces.

[1] D. Cichoń, J. Stochel, F.H. Szafraniec, Noncommuting domination, *Oper. Theory Adv. Appl.* 154 (2004), 19-33 .

[2] M. Wojtylak, Noncommuting domination in Krein spaces via commutators of block operator matrices, (to appear).