Abstract

Let (E_0, E_1) be a compatible couple of Banach spaces, and let $E_\lambda : 0 \leq \mathrm{Re}\ \lambda \leq 1$ be the complex interpolation spaces of E_0, E_1. Let T be a closed linear operator on $E_0 + E_1$, then the restriction T_λ of T to each E_λ is closed. If we denote by $\tilde{\sigma}(T_\lambda)$ the extended spectrum of T_λ in E_λ, then, under appropriate conditions, it is shown that the map $\lambda \mapsto \tilde{\sigma}(T_\lambda)$ is an analytic multifunction in the strip $\{\lambda \in \mathbf{C} : 0 < \mathrm{Re}\ \lambda < 1\}$. We use these results to give some applications to the spectral theory of semigroups.