On an analogue of formulae Sohotski–Plemelj

E. Cheremnikh

Let $H = L^2(0, \infty)$ and $T = S + A^*B$ where $(S\varphi)(\tau) \equiv \tau\varphi(\tau)$, $A, B\colon H \to G$ are integrals operators and G is auxiliary Hilbert space. Let

$$D(\widetilde{S}) = \left\{ \varphi \in H\colon \exists c \equiv c(\varphi)\colon \int\limits_0^\infty |c(\varphi) + s\varphi(s)|^2 \rho(s) ds < \infty \right\}$$

and $\widetilde{S}\varphi(s) = c(\varphi) + s\varphi(s)$, $\varphi \in D(\widetilde{S})$.

Let $\widetilde{T} = \widetilde{S} + A^*B$, $D(\widetilde{T}) = D(\widetilde{S})$ and $T_\xi = (T - \xi)^{-1}$, $\widetilde{T}_\xi = (\widetilde{T} - \xi)^{-1}$. We discuss the relation

$$(T_\sigma \varphi, \psi)_\pm = (\varphi, b_\sigma)(a_\sigma^\pm \psi) + (\widetilde{T}_\sigma \varphi, \psi)_H$$

between the limit values $(T_\sigma\varphi, \psi)_\pm = \lim\limits_{\tau \to +0} (T_{\sigma \pm i\tau}\varphi, \psi)$ and bilinear form of the resolvent $(\widetilde{T}_\sigma \varphi, \psi)_H$ of maximal operator $\widetilde{T}$.

References

[1] Cheremnikh E. V. A remark about calculation of the jump of the resolvent in Friedrichs' model // Eastern European J. of Enteprise and Technol. —2012. —V.55. —N.1/4. —P.37–40.