On some questions of operator theory

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In the present talk we mainly give some new applications of Berezin symbols technique. In particular, the Berezin symbol is used in approximation problem for H^∞-functions. We also study asymptotic multiplicativity of the Berezin symbols. Moreover, we investigate solvability of some Riccati operator equations of the form $XAX + XB - CX = D$ on the Toeplitz algebra $\mathcal{T}$, which is the C^*-subalgebra of the operator algebra $\mathcal{B}\left(L_a^2\right)$ generated by Toeplitz operators $\{Tg : g \in H^\infty\left(\mathbb{D}\right)\}$ on the Bergman space $L_a^2\left(\mathbb{D}\right)$ over the unit disc $\mathbb{D} = \{z \in \mathbb{C} : |z| < 1\}$. We characterize compact truncated Toeplitz operators $A_\varphi := P_{K_\theta} T_\varphi | K_\theta$, $\varphi \in L^\infty\left(\partial\mathbb{D}\right)$, in terms of Berezin symbols. The spectrum of model operators $\varphi\left(M_\theta\right)$, $\varphi \in H^\infty\left(\mathbb{D}\right)$, is localized in terms of so-called Berezin set by proving that $\sigma\left(\varphi\left(M_\theta\right)\right) \subset closBer\left(\varphi\left(M_\theta\right)\right)$. Some other questions are also discussed.

This is a joint work with M.T. Karaev.