INTERNATIONAL BIWEEKLY ONLINE SEMINAR ON ANALYSIS, DIFFERENTIAL EQUATIONS AND MATHEMATICAL PHYSICS

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JOIN THE SEMINAR

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Toeplitz operators and Bergman projections on weighted spaces of holomorphic functions

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For an open subset $O \subset \mathbb{C}$, $1 \le p < \infty$ and a continuous function $v: O \to]0, \infty[$ put

$$\|f\|_{\{v,p\}} = \left(\int_O |f(z)|^p \, v(z) \, dm(z) \right)^{1/p} \quad \text{and} \quad \|f\|_{\{v,\infty\}} = \operatorname{ess\,sup}_{z \in O} |f(z)| \, v(z),$$

where dm is the area measure on O. Consider the spaces

$$L^p_v = \{f: O \to \mathbb{C} \text{ measurable: } \|f\|_{\{v,p\}} < \infty\}, \quad H^p_v = \{h \in L^p_v: \ h \text{ holomorphic}\}.$$

Let $P_v: L^2_v \to H^2_v$ be the orthogonal projection (Bergman projection). For measurable f and holomorphic h on O put $T_f(h) = P_v(fh)$ (Toeplitz operator).

If O is the unit disc $\mathbb{D}$ or the upper half plane we present conditions on v and f such that T_f is a well-defined and bounded operator $H^\infty_v \to H^\infty_v$.

Moreover, if

$$v(z) = \exp\left(\frac{-\alpha}{(1-|z|^l)^\beta}\right) \quad and \quad \tilde{v}(z) = \exp\left(\frac{-\tilde{\alpha}}{(1-|z|^l)^{\tilde{\beta}}}\right), \ z \in \mathbb{D},$$

we determine all $l, \alpha, \tilde{\alpha}, \beta, \tilde{\beta} > 0$ and $1 \le p \le \infty$ such that $P_{\tilde{v}}$ is also a bounded operator $L^p_v \to H^p_v$.

This is a joint work with J.Bonet and J.Taskinen.

*Seminar website: https://msrn.sfedu.ru/sl. The seminar uses Microsoft Teams online platform.
Please send questions to ademp.seminar@gmail.com (Tatiana Andreeva, scientific secretary).

The seminar is organized by the coordinators Alexey Karapetyants and Vladislav Kravchenko within the activities of the Regional Mathematical Center of the Southern Federal University in collaboration with Institute of Mathematics, Mechanics and Computer Sciences of the Southern Federal University and the OTHA research group in Operator Theory and Harmonic Analysis.

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