On Hadamard Products and Bergman-Type Operators in the Upper Half-Plane

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Abstract. The paper is devoted to the study of Hadamard products and Bergman–type operators in the upper half-plane. Weighted Bergman spaces $A^2_\lambda(\Pi)$ are considered, and an isometric representation of these spaces in terms of a weighted Laplace transform is established.

The Hadamard–Bergman convolution, defined by means of an integral operator in the upper half-plane, is introduced. It is shown that this convolution coincides with the Hadamard product of functions defined on the positive half-line after applying the Laplace transform. In particular, the commutativity of the corresponding operation is established.

In addition, the Bergman projection and its representation by means of an integral kernel are considered, and a connection with fractional-order integro-differential operators is established. The results obtained generalize known constructions for the unit disk to the setting of the upper half-plane.

Keywords: Hadamard–Bergman convolution, upper half-plane, Bergman–Jerbashian space, Fourier–Laplace transform

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