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Convex Conjugates of Analytic Functions of Logarithmically Convex Functionals

Let $f_{\mathbf{c}}(r) = \sum_{n=0}^{\infty} e^{c_n} r^n$ be an analytic function; $\mathbf{c} = (c_n) \in l_{\infty}$. We assume that r is some logarithmically convex and lower semicontinuous functional on a locally convex topological space L . In this paper we derive a formula on the Legendre-Fenchel transform of a functional

$$\widehat{\lambda}(\mathbf{c}, \varphi) = \ln f_{\mathbf{c}}(e^{\lambda(\varphi)}),$$

where $\lambda(\varphi) = \ln r(\varphi)$ ($\varphi \in L$). In this manner we generalize to the infinite case Theorem 3.1 of the paper of U. Ostaszewska and K. Zajkowski ["Legendre-Fenchel transform of the spectral exponent of polynomials of weighted composition operators", *Positivity*, DOI 10.1007/s11117-009-0023-6].

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