

An ‘inverse Fekete—Szegő problem’ and filtration of generators

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Abstract

In this talk we introduce and explore a question that can be interpreted as an ‘inverse Fekete—Szegő problem’. Addressing this problem reveals a connection to the concept of filtration of infinitesimal generators. These filtration classes are inherently significant, especially due to their applications in the study of semigroups of holomorphic mappings within the unit disk. To address the array of questions arising in this context, we define new filtration classes based on a non-linear differential operator:

$$\alpha \cdot \frac{f(z)}{z} + \beta \cdot \frac{zf'(z)}{f(z)} + (1 - \alpha - \beta) \cdot \left[1 + \frac{zf''(z)}{f'(z)} \right].$$

We establish key properties of these classes and derive sharp upper bounds for the modulus of the Fekete—Szegő functional over specific filtration classes. Additionally, we present several open problems to inspire further research in this area.

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