

## The Loewner PDE, inverse Loewner chains and nonlinear resolvents of the Carathéodory family in infinite dimensions

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**Abstract.** In this paper we generalize the existence and uniqueness result for the solutions of the Loewner partial differential equation (Loewner PDE) from  $\mathbb{C}^n$  to the case of separable reflexive complex Banach spaces. Next, as an application, we prove an existence and uniqueness result for the solutions of the inverse Loewner differential equation. Related results on univalent subordinations and the Schwarz mappings associated with univalent subordination chains are obtained. Finally, we study various properties of nonlinear resolvents of holomorphic mappings in the Carathéodory family  $\mathcal{M}(\mathbb{B})$ , where  $\mathbb{B}$  is the unit ball of a complex Hilbert space.

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