**Dineen, Seán; Timoney, Richard M.**

**Complex geodesics on convex domains.** (English) Zbl 0785.46044

Progress in functional analysis, Proc. Int. Meet. Occas. 60th Birthd. M. Valdivia, Peñíscola/Spain, North-Holland Math. Stud. 170, 333-365 (1992).

Let $\rho$ denote the Poincaré metric on the open unit disk $\mathbb{D}$ of $\mathbb{C}$. Let $\mathcal{D}$ be a convex bounded domain in a complex Banach space $X$. For $p, q \in \mathcal{D}$ let $d(p,q) = \sup \rho(f(p), f(q))$, where the sup is taken over all holomorphic mappings $f : \mathcal{D} \to \mathbb{D}$; this is called the Carathéodory metric on $\mathcal{D}$. A complex geodesic is a holomorphic mapping $\phi : \mathbb{D} \to \mathcal{D}$ such that $\rho(u,v) = d(\varphi(u), \varphi(v))$ for all $u, v \in \mathbb{D}$. In this paper existence and uniqueness of complex geodesics joining two points of a convex bounded domain in a Banach space $X$ are considered. Existence is proved for the unit ball of $X$ under the assumption that $X$ is 1-complemented in its bidual. Uniqueness (up to reparametrisation) is proved for strictly convex bounded domains in spaces with the analytic RNP.

{Reviewer's remark: In Theorem 4.4 and elsewhere a bar above $\mathbb{D}$ is occasionally missing}.

For the entire collection see [Zbl 0745.00031].

Reviewer: D.Werner (Berlin)

**MSC:**

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|---|---|
| 46G20 | Infinite-dimensional holomorphy |
| 46B20 | Geometry and structure of normed linear spaces |
| 46B22 | Radon-Nikodým, Kreĭn-Milman and related properties |
| 46B25 | Classical Banach spaces in the general theory |



**Keywords:**

holomorphy in Banach spaces; analytic Radon-Nikodym property; Poincaré metric on the open unit disk; Carathéodory metric; complex geodesic; holomorphic mapping; existence and uniqueness of complex geodesics joining two points of a convex bounded domain in a Banach space; analytic RNP

**Biographic references:**

Valdivia, M.

**Full Text:** arXiv