The Julia-Caratheodory Theorem on the Bidisk

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Abstract

I will discuss the various kinds of singularities that can occur on the boundary of self-maps of the polydisk in the context of so-called Julia-Caratheodory theorems. The classical Julia-Caratheodory establishes that any function from the disk to the disk which satisfies some mild asymptotic condition near a boundary point nontangentially actually has a nontangential limit, and, furthermore, has a derivative which is valid for directions pointing into the disk. Agler, McCarthy, and Young extended the Julia-Caratheodory theorem to the bidisk but noted nice behavior came in at least two strengths, which they called B-points and C-points. My recent work with John McCarthy gave a characterization of when a B-point was indeed a C-point which relied on nice integral representations for the derivative at a B-point developed by Agler, Tully-Doyle and Young.