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Multipoint Julia theorems

Abstract

Following ideas introduced by Beardon-Minda and by Baribeau-Rivard-Wegert in the context of the Schwarz-Pick lemma, we use the iterated hyperbolic difference quotients to prove a multipoint Julia lemma. As applications, we give a sharp estimate from below of the angular derivative at a boundary point, recovering in this setting a formula very recently proved by Fournier and Roth and generalizing results due to Osserman, Mercer and others; and we prove a generalization to multiple fixed points of an interesting estimate due to Cowen and Pommerenke