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An overview of the Schwarzian derivative in several complex variables

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Abstract

We present a survey of one of the definitions of Schwarzian derivatives in several complex variables that is due to T. Oda. We discuss the main properties such as invariance, a chain rule and a connection with a system of partial differential equations that involve the jacobian of the mapping. The system provides a formal characterization of univalence analogous to the case in one variable. We will also discuss how these operators give rise to differential operators of order two and three, and how these operators inherit a norm from the domain. We analyze the important procedure of normalization at a fixed point in a given domain, and show how this relates to the order of the families with bounded Schwarzian norm. As a consequence of the fact that in the ball these norms are invariant under the group of automorphisms, the normalization at the origin carries through to a normalization everywhere, and from there to an analogue of the Ahlfors-Weill extension for mappings with sufficiently small Schwarzian norm. This involves joint work with Rodrigo Hernández.