

1067-39-1690

Ruth D Enoch* (renoch@atu.edu), Arkansas Tech University, Department of Mathematics, 1811 North Boulder Avenue, Russellville, AR 72801-2222. *Formal power series solutions of Schröder's functional equation.*

In 1884, Königs showed that when $\varphi(z)$ is an analytic self-map of the unit disk fixing the origin, with $0 < |\varphi'(0)| < 1$, then Schröder's functional equation, $\psi \circ \varphi(z) = \varphi'(0)\psi(z)$, can be solved for a unique analytic function $\psi(z)$ in the disk with $\psi'(0) = 1$. In 2003, Cowen and MacCluer considered an analogue in the unit ball of \mathbb{C}^N for $N > 1$. They gave necessary and sufficient conditions for the existence of an analytic solution σ satisfying $\sigma'(0) = I$ when $\varphi'(0)$ is diagonalizable. In 2006, Enoch considered the case in which $\varphi'(0)$ is not diagonalizable. Both $\varphi(z)$ and $\sigma(z)$ are regarded as vectors of purely formal power series, and it is not assumed that $\varphi(z)$ is analytic or that the series for $\varphi(z)$ or $\sigma(z)$ converge. However, because of a process developed by Cowen and MacCluer, if the given $\varphi(z)$ represents a map of the unit ball into itself of an appropriate form, then Enoch's results can be used to produce solutions of Schröder's equation that are convergent power series, or (sometimes) to show that no such solution exists. A method of matrix completion is used. (Received September 21, 2010)