Extension operators that preserve certain geometric and analytic properties

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In this talk we are concerned with certain extension operators which take a univalent function f on the unit disc U to a univalent mapping F from the Euclidean unit ball B^n in $\mathbb{C}^n$ into $\mathbb{C}^n$, with the property that $f(z_1) = F(z_1, 0)$. This subject began with the Roper-Suffridge extension operator, introduced in 1995, which has the property that if f is a convex function of U then F is a convex mapping of B^n.

We consider certain generalizations of the Roper-Suffridge extension operator. We show that these operators preserve the notion of g-Loewner chains, where $g(\zeta) = (1 - \zeta)/(1 + (1 - 2\gamma)\zeta)$, $|\zeta| < 1$ and $\gamma \in (0, 1)$. As a consequence, the considered operators preserve certain geometric and analytic properties, such as g-parametric representation, starlikeness of order γ, spirallikeness of type δ and order γ, almost starlikeness of order δ and type γ.

Moreover, we use the method of Loewner chains to generate certain subclasses of normalized biholomorphic mappings on the Euclidean unit ball B^n in $\mathbb{C}^n$, which have interesting geometric characterizations.

References

[1] T. Chirilă, *Analytic and geometric properties associated with some extension operators*, Complex Var. Elliptic Equ., **59** (2014), 427–442.

[2] T. Chirilă, *An extension operator associated with certain g-Loewner chains*, Taiwanese J. Math., 17, **5** (2013), 1819-1837.

[3] T. Chirilă, *Subclasses of biholomorphic mappings associated with g-Loewner chains on the unit ball in $\mathbb{C}^n$*, Complex Var. Elliptic Equ., to appear, doi.org/10.1080/17476933.2013.856422.

[4] I. Graham, H. Hamada, G. Kohr, *Parametric representation of univalent mappings in several complex variables*, Canadian J. Math., **54** (2002), 324–351.

[5] I. Graham, G. Kohr, *Geometric Function Theory in One and Higher Dimensions*, Marcel Dekker Inc., New York, 2003.

[6] I. Graham, G. Kohr, M. Kohr, *Loewner chains and the Roper-Suffridge Extension Operator*, J. Math. Anal. Appl., **247** (2000), 448-465.

[7] J.A. Pfaltzgraff, T.J. Suffridge, *An extension theorem and linear invariant families generated by starlike maps*, Ann. Mariae Curie Sklodowska, Sect. A, **53** (1999), 193–207.

[8] C. Pommerenke, *Univalent Functions*, Vandenhoeck & Ruprecht, Göttingen, 1975.