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Cases of Equality for a Class of Bound-Preserving Operators over $\mathcal{P}_n$

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Abstract. Let $\mathbb{D}$ denote the unit disc of the complex plane and $\mathcal{P}_n$ the class of polynomials of degree at most n with complex coefficients. We give a new proof of

$$\left|p(z) - \frac{zp'(z)}{n}\right| + \left|\frac{zp'(z)}{n}\right| \leq |p|_{\mathbb{D}}, \qquad z \in \overline{\mathbb{D}},\, p \in \mathcal{P}_n,$$

together with a complete discussion of all cases of equality. We also discuss an extension, due to Ruscheweyh, of the above inequality.

Keywords. Complex polynomials, Bernstein inequality, generalizations of Bernstein inequality.

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