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L_p Inequalities for the Polar Derivative of a Polynomial

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Abstract:

Let $D_\alpha P(z)$ denote the polar derivative of a polynomial $P(z)$ of degree n with respect to real or complex number α. If $P(z)$ does not vanish in $|z| < k, k \geq 1$, then it has been proved that for $|\alpha| \geq 1$ and $p > 0$,

$$\|D_\alpha P\|_p \leq \left(\frac{|\alpha| + k}{\|k + z\|_p} \right) \|P\|_p .$$

An analogous result for the class of polynomials having no zero in $|z| > k, k \leq 1$ is also obtained.