

INEQUALITIES FOR POLYNOMIALS WITH A PRESCRIBED ZERO

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Abstract. For a polynomial $p(z)$ of degree n , having a zero of order k (≥ 1) at β , we have obtained

$$\max_{|z|=1} \left| \frac{p(z)}{(z-\beta)^k} \right| \leq \left(\frac{n-k+1}{1+|\beta|} \right)^k \max_{1 \leq l \leq n-k+1} |p(v'_l)|,$$

$v'_1, v'_2, \dots, v'_{n-k+1}$ being the roots of $z^{n-k+1} + e^{i\gamma(n-k+1)} = 0$, with $\gamma = \arg \beta$ ($\gamma = 0$ for $\beta = 0$), thereby extending the previously known estimate (i. e. $\max_{|z|=1} \left| \frac{p(z)}{z-\beta} \right| \leq \frac{n}{1+\beta} \max_{1 \leq i \leq n} |p(z_i)|$, $\beta \geq 0$, z_1, z_2, \dots, z_n being the roots of $z^n + 1 = 0$).

Mathematics subject classification (1991): 30C10, 30A10.

Key words and phrases: Polynomials, prescribed zero, roots.

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