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Gardner, R. B. [Gardner, Robert Bentley] (1-ETNS); **Govil, N. K.** (1-ABRN)
Some generalizations of the Eneström-Kakeya theorem.
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The authors give some generalizations of the Eneström theorem, which states that all the zeros of a polynomial, with positive real coefficients a_ν, lie in the annulus $\alpha \le |z| \le \beta$ when $\alpha = \min_{0\le\nu\le n}\{a_\nu/a_{\nu+1}\}$ and $\beta = \max_{0\le\nu\le n}\{a_\nu/a_{\nu+1}\}$. They prove Theorem 1, which states that all of the zeros of the polynomial $\sum_{\nu=0}^n(\alpha_\nu + i\beta_\nu)z^\nu$ lie in the annulus $R_1 \le |z| \le R_2$, where for some k and positive t, $\alpha_0 \le t\alpha_1 \le t^2\alpha_2 \le \cdots \le t^k\alpha_k \ge t^{k+1}\alpha_{k+1} \ge t^{k+2}\alpha_{k+2} \ge \cdots \ge t^n\alpha_n$ and the expressions for R_1 and R_2 involve α_ν, β_ν, k and t. From this theorem the authors derive two corollaries and two more theorems. In their example, they show that all the zeros of $1+10z+20z^2+40z^3+80z^4+50z^5$ lie in $0.499 \le |z| \le 0.840$. *M. K. Jain*