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ESTIMATES FOR THE MODULII OF THE ZEROS OF A POLYNOMIAL

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Abstract. In this paper, we prove a more general result concerning the location of the zeros of a polynomial in a ring shaped region from which we deduce an interesting and significant refinement of a classical result of Cauchy. A variety of other results, which in particular include several known extensions and generalizations of Enestrom - Kakeya Theorem, can be established from this result by a fairly uniform procedure.

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REFERENCES

[1] A. AZIZ, Q. G. MOHAMMAD, *Zero-free Regions for Polynomials and some Generalizations of Enestrome-Kakeya Theorem*, Canad. Math.Bull., **27**, 3, (1984), 265–272.
[2] P. BORWEIN, T. ERDELYI, *Polynomial and Polynomial Inequalities*, Springer-Verlag, Beijing, 1997, pp. 16–17.
[3] J. L. DIAZ BARRERO, *An Annulus for the Zero's of Polynomials*, J. Math. Anal. Appl.. **273**, (2002), 349–352.
[4] A. JOYAL, G. LABELLE AND Q. I. RAHMAN, *On the Location of the Zero's of Polynomials*, Canadian Math, Bull., **10**, (1967), 53–63.
[5] M. MARDEN, *Geometry of Polynomials*, IInd Ed., Math, Surveys, No.3, Amer.Math.Soc. Providence, R.I, 1966.
[6] G. V. MILOVANOVIĆ, D. S. MITRINOVIĆ AND TH. M. RASSIAS, *Topics in Polynomials; Extremal Problems, Inequalities Zeros*, World Scientific, Singapore, New Jersey, London, Hong-Kong, 1994.
[7] G. V. MILOVANOVIĆ, T. M RASSIAS, *Inequalities for Polynomial Zeros* in T.M.Rassias [Ed], Survey on Classical Inequalities, Kluwer Academic, Netherlands, 2000, pp. 165–202.
[8] G. V. MILOVANOVIĆ, T. M RASSIAS, *Distribution of Zeros and Inequalities for zeros of algebraic polynomials* in T. M Rassias, [Ed], Functional Equations and Inequalities, Kluwer Academic, Dordrecht, 2000, pp. 171–204.
[9] Q. I. RAHAMN, G. SCHMEISSER, *Analytic Theory of Polynomials*, Clarendon Press-Oxford 2002, pp. 243–270.
[10] I. NIVERI, H. S. ZUCKERMAN, *An Introduction to the Theory of Numbers*, Third Ed., Wiley Easter Limited, 1972.
[11] J. L. WALSH, *An Inequality for the Roots of an Algebraic Equation*, Ann. of Math. **25**, (1924), 749–754.

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