

HOMOGENEOUS MEANS GENERATED BY A MEAN-VALUE THEOREM

JANUSZ MATKOWSKI AND IWONA PAWLIKOWSKA

Abstract. A variant of Cauchy mean-value theorem is presented. Applying a counterpart of the Lagrange mean-value theorem, we introduce new type of means. The functions generating the homogeneous means of this type are determined. In some special cases the effective formulas for these means are presented. Mean-value-theorems which do not lead to any mean are also mentioned.

Mathematics subject classification (2010): Primary 26A24; Secondary 39B22.

Keywords and phrases: Mean-value theorem, mean, homogeneous mean, implicit function, inequalities.

REFERENCES

- [1] J. ACZÉL, *Lectures on functional equations and their applications*, Academic Press, New York and London, 1966.
- [2] P.S. BULLEN, D.S. MITRINOVIĆ, P.M. VASIĆ, *Means and their inequalities*, D. Reidel Publishing Company, Dordrecht-Boston-Lancaster-Tokyo, 1988.
- [3] P.S. BULLEN, *Handbook of Means and Their Inequalities*, Mathematics and Its Applications, Vol. **560**, Kluwer Academic Publishers, Dordrecht-Boston-London, 2003.
- [4] M. DAS, T. RIEDEL, AND P.K. SAHOO, *Flett's mean value theorem for approximately differentiable functions*, *Radovi Matematički*, **10** (2001), 157–164.
- [5] T. M. FLETT, *A mean value theorem*, *Math. Gazette*, **42** (1958), 38–39.
- [6] M. KUCZMA, *An introduction to the theory of functional equations and inequalities. Cauchy's equation and Jensen's inequality*, *Prace Naukowe Uniwersytetu Śląskiego w Katowicach*, Uniwersytet Śląski, Katowice, Państwowe Wydawnictwo Naukowe (PWN), Warsaw, 1985.
- [7] I. PAWLIKOWSKA, *An extension of a theorem of Flett*, *Demonstratio Math.*, **32** (1999), 281–286.
- [8] PRASSANNA K. SAHOO, *Some results related to the integral mean value theorem*, *Internat. J. Math. Ed. Sci. Tech.*, **38**, 6 (2007), 818–822.