Mathematical
Inequalities
& Applications
Volume 9, Number 3 (2006), 375–389

ON THE INTERMEDIATE POINT IN CAUCHY'S MEAN–VALUE THEOREM

DOREL I. DUCA AND OVIDIU POP

Abstract. If the functions $f, g : I \to \mathbb{R}$ are differentiable on the interval $I \subseteq \mathbb{R}$, then for each $x, a \in I$ there exists a real number $\theta \in]0,1[$ such that

$$(f(x) - f(a))\, g^{(1)}(a + \theta(x-a)) = (g(x) - g(a))\, f^{(1)}(a + \theta(x-a)).$$

In this paper we study the behaviour of the number $\theta \in]0,1[$, when x approaches a.

Mathematics subject classification (2000): 26A24.
Key words and phrases: Cauchy's theorem, intermediate point, mean-value theorem.

REFERENCES

[1] HERBERT AMANN, JOACHIM ESCHER, *Analysis*, Birkhauser Verlag, Basel-Boston-Berlin, I (1998), II (1999), III (2001).
[2] D. ANDRICA, D. I. DUCA, I. PURDEA AND I. POP, *Basic Mathematics* (in Romanian), Studium Publishing House, Cluj-Napoca, 2002.
[3] D. AZAGRA, J. GOMEZ AND J. A. JARAMILLO, *Rolle's Theorem and Negligibility of Points in Infinite Dimensional Banach Spaces*, Journal of Mathematical Analysis and Applications, **213** (1997), 487–495.
[4] R. G. BARTLE, D. R. SHERBERT, *Introduction to Real Analysis*, 3rd., J. Wiley, New York, 2000.
[5] D. I. DUCA, *A Note on the Mean Value Theorem*, Didactica Matematicii, **19** (2003), 91–102.
[6] D. I. DUCA, O. POP, *On the Intermediate Point in the Mean Value Theorem*, to appear
[7] G. B. FOLLAND, *Real Analysis*, J. Wiley, New York, 1999.
[8] M. FURI, M. MARTELLI, *On the Mean Value Theorem, Inequality, and Inclusion*, The American Mathematical Monthly, **98**, (1991), 840–846.
[9] ELLIOTT H. LIEB, MICHAEL LOSS, *Analysis*, American Mathematical Society, 1997.
[10] R. MERA, *On the Determination of the Intermediate Point in Taylor's Theorem*, The American Mathematical Monthly, **99**, (1992), 56–58.
[11] J. P. PENOT, *Mean-Value Theorem with Small Subdifferentials*, Journal of Optimization Theory and Applications, **94**, (1997), 209–221.
[12] W. RUDIN, *Real and Complex Analysis*, third edition, McGraw Hill, New York, 1987.
[13] E. SCHECHTER, *Handbook of Analysis and its Foundations*, Academic Press, San Diego, 1997.