

Dedicated to Prof. Juan Nieto on the occasion of his 60th anniversary

A generalization of the Pompeiu mean-value theorem to compact sets

LARISA CHEREGI and VICUȚA NEAGOS

ABSTRACT.

We generalize the Pompeiu mean-value theorem by replacing the graph of a continuous function with a compact set.

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REFERENCES

- [1] Abel, U. and Ivan, M., *A new proof of a Stamate mean-value theorem*, Automat. Comput. Appl. Math., **11** (2002), No. 1, 10–14
- [2] Aziz, A. K. and Diaz, J. B., *On Pompeiu's proof of the mean-value theorem of the differential calculus of real-valued function*, Contributions to Differential Equations, **1** (1963), 467–481
- [3] Boggio, T., *Sur une proposition de M. Pompeiu*, Mathematica, Timișoara, **23** (1948), 101–102
- [4] Cerone, P., Dragomir, S. S. and Kikianty, E., *Ostrowski and trapezoid type inequalities related to Pompeiu's mean value theorem*, J. Math. Inequal., **9**(2015), No. 3, 739–762, DOI 10.7153/jmi-09-61. URL <https://doi.org/10.7153/jmi-09-61>
- [5] Cerone, P., Dragomir, S. S. and Kikianty, E., *Ostrowski and trapezoid type inequalities related to Pompeiu's mean value theorem with complex exponential weight*, J. Math. Inequal., **11** (2017), No. 4, 947–964, DOI 10.7153/jmi-2017-11-72, URL <https://doi.org/10.7153/jmi-2017-11-72>
- [6] Dragomir, S. S., *An inequality of Ostrowski type via Pompeiu's mean value theorem*, JIPAM. J. Inequal. Pure Appl. Math., **6** (2005), No. 3, Article 83, 9 pp.
- [7] Dragomir, S. S., *A survey on Ostrowski type inequalities related to Pompeiu's mean value theorem*, Khayyam J. Math., **1** (2015), No. 1, 1–35
- [8] Ivan, M., *On some mean value theorems*, Atheneum, Cluj, (1970), 23–25
- [9] Ivan, M., *Mean value theorems in mathematical analysis* (in Romanian), Master's thesis, Babeș-Bolyai University, Cluj (1973)
- [10] Ivan, M., *A note on a Pompeiu-type theorem*, In: Mathematical analysis and approximation theory, Burg, Sibiu, (2002), 129–134
- [11] Ivan, M. and Abel, U., *A Pompeiu-type mean-value theorem and divided differences*, In: B. Bojanov (ed.) Constructive Theory of Functions, Varna 2002, 314–319, DARBA, Sofia (2003), ISBN 954-90126-6-2
- [12] Pachpatte, B. G., *On Grüss like integral inequalities via Pompeiu's mean value theorem*, JIPAM. J. Inequal. Pure Appl. Math., **6** (2005), No. 3, Article 82, 5 pp.
- [13] Pompeiu, D., *Sur une proposition analogue au théorème des accroissements finis*, Mathematica, **22** (1946), 143–146
- [14] Pop, M. S., *Asupra unei teoreme de medie a lui Flett*, Lucr. Semin. Creativ. Mat., **3** (1993-1994), 79–88 (in Romanian)
- [15] Pop, M. S. and Kovacs, G., *Generalizari ale unei formule de medie*, Lucr. Semin. Creativ. Mat., **3** (1994-1995), 119–126 (in Romanian)
- [16] Pop, O. T., *About some mean-value theorems*, Creat. Math. Inform., **14** (2005), 49–52

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Corresponding author: Vicuța Neagos; vicuta.neagos@math.utcluj.ro

- [17] Pop, O. T. and Bărbosu, D., *A mean-value theorem and some applications* Didactica Matematica, **31** (2013), No. 1, 47–50
- [18] Sahoo, P. K. and Riedel, T., *Mean value theorems and functional equations*, World Scientific Publishing Co., Inc., River Edge, NJ (1998), URL <https://doi.org/10.1142/9789812816047>
- [19] Sarikaya, M. Z., *Some new integral inequalities via variant of Pompeiu's mean value theorem*, Math. Morav., **19** (2015), No. 2, 89–95, DOI 10.5937/matmor1502089s. URL <https://doi.org/10.5937/matmor1502089s>
- [20] Sarikaya, M. Z. and Budak, H., *An inequality of Grüss like via variant of Pompeiu's mean value theorem* Konuralp J. Math., **3** (2015), No. 1, 29–35

DEPARTMENT OF MATHEMATICS
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA
MEMORANDUMULUI 28, 400114 CLUJ-NAPOCA, ROMANIA
E-mail address: larisa.cheregi@math.utcluj.ro
E-mail address: vicuta.neagos@math.utcluj.ro