

HARMONIC POLYNOMIALS AND GENERALIZATIONS OF OSTROWSKI–GRÜSS TYPE INEQUALITY AND TAYLOR FORMULA

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Abstract. Some generalizations of Ostrowski–Grüss type inequality and Taylor formula are given, by using harmonic sequences of polynomials. We use inequalities for the Čebyšev functional in terms of the first derivative (see [6]), for some new bounds for the remainders.

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REFERENCES

- [1] M. ABRAMOWITZ AND I. A. STEGUN (Eds.), *Handbook of mathematical functions with formulae, graphs and mathematical tables*, National Bureau of Standards, Applied Math. Series 55, 4th printing, Washington 1965.
- [2] G. A. ANASTASSIOU, *Ostrowski type inequalities*, Proc. Amer. Math. Soc. **123** (1995), 3775–3781.
- [3] P. APPELL, *Sur une classe de polynômes*, Ann. Sci. Ecole Norm. Sup. **9**, 2 (1880), 119–144.
- [4] P. CERONE, *Three point rules in numerical integration*, RGMIA, Research Report Collection **3**, 2 (2000), 299–312.
- [5] P. CERONE, S. S. DRAGOMIR AND J. ROUMELIOTIS, *Some Ostrowski's type inequalities for n-times differentiable mappings and applications*, RGMIA, Research Report Collection **1**, 1 (1988).
- [6] P. CERONE AND S. S. DRAGOMIR, *Some new bounds for the Čebyšev functional in terms of the first derivative and applications*, J. Math. Ineq. **8**, 1 (2014), 159–170.
- [7] LJ. DEDIĆ, M. MATIĆ AND J. PEČARIĆ, *On generalizations of Ostrowski inequality for Lipschitz functions and functions of bounded variation*, Math. Inequal. Appl. **3**, 1 (2000), 1–14.
- [8] LJ. DEDIĆ, M. MATIĆ AND J. PEČARIĆ, *On generalizations of Ostrowski inequality via some Euler-type identities*, Math. Inequal. Appl. **3**, 3 (2000), 337–353.
- [9] LJ. DEDIĆ, M. MATIĆ, J. PEČARIĆ AND A. VUKELIĆ, *On generalizations of Ostrowski inequality via some Euler harmonic identities*, J. Inequal. Appl. **7**, 6 (2002), 787–805.
- [10] S. S. DRAGOMIR AND S. WANG, *An inequality of Ostrowski–Grüss type and its applications to the estimation of error bounds for some special means and for some numerical quadrature rules*, Comput. Math. Appl. **33**, 11 (1997), 16–20.
- [11] S. S. DRAGOMIR, *Better bounds in some Ostrowski–Grüss type inequalities*, RGMIA, Research Report Collection **3**, 1 (2000), 25–31.
- [12] S. S. DRAGOMIR, *New estimation of the Remainder in Taylor's Formula Using Grüss Type Inequalities and Applications*, Math. Inequal. Appl. **2**, 2 (1999), 183–193.
- [13] S. S. DRAGOMIR, *An improvement of the remainder estimate in the generalised Taylor formula*, RGMIA, Research Report Collection **3**, 1 (2000), 3–8.
- [14] A. M. FINK, *Bounds on the deviation of a function from its averages*, Czechoslovak Math. J. **42**, 117 (1992), 289–310.
- [15] M. MATIĆ, J. PEČARIĆ AND N. UJEVIĆ, *Improvement and further generalizations of some inequalities of Ostrowski–Grüss type*, Computer. Math. Appl. **39** (2000), 161–175.
- [16] M. MATIĆ, J. PEČARIĆ AND N. UJEVIĆ, *On new estimation of the remainder in generalized Taylor's formula*, Math. Inequal. Appl. **2**, 3 (1999), 343–361.

- [17] G. V. MILOVANOVIĆ AND J. E. PEČARIĆ, *On generalizations of the inequality of A. Ostrowski and some related applications*, Univ. Beograd. Publ. Elektrotehn. Fak., Ser. Mat. Fiz., No. 544–No. 576 (1976).
- [18] D. S. MITRINOVIĆ, J. PEČARIĆ AND A. M. FINK, *Inequalities Involving Functions and their Integrals and Derivatives*, Kluwer Acad. Publ., Dordrecht, 1991.
- [19] C. E. M. PEARCE, J. PEČARIĆ, *On Anastassiou's generalizations of the Ostrowski inequality and related results*, J. Comput. Anal. Appl. **2**, 3 (2000), 215–235.
- [20] C. E. M. PEARCE, J. PEČARIĆ, S. VAROŠANEC, *Generalizations of some inequalities of Ostrowski-Grüss type*, Math. Ineq. Appl. **3**, 1 (2000), 25–34.
- [21] J. PEČARIĆ, S. VAROŠANEC, *Harmonic Polynomials and generalizations of Ostrowski inequality with applications in numerical integration*, Nonlin. Anal. **47** (2001), 2365–2374.