

## GENERALIZED STEFFENSEN'S INEQUALITY

ASFAND FAHAD, JOSIP PEČARIĆ AND MARJAN PRALJAK

*Abstract.* We give a generalization of Steffensen's inequality by extending the results of Pečarić [4] and Rabier [5]. We make use of the  $n$ -order Taylor expansion of a composition of functions and Faà di Bruno's formula for higher order derivatives of the composition.

*Mathematics subject classification (2010):* 26D10, 26D15.

*Keywords and phrases:* Steffensen's inequality, Faà di Bruno's formula.

### REFERENCES

- [1] A. ČIŽMEŠIJA AND J. PEČARIĆ, *Some new generalizations of inequalities of Hardy and Levin-Cochran-Lee*, Bull. Aust. Math. Soc. **63**, 1 (2001), 105–113.
- [2] E. HEWITT AND K. STROMBERG, *Real and abstract analysis*, 3rd edition, Springer, New York, 1975.
- [3] W. P. JOHNSON, *The Curious History of Faà di Bruno's Formula*, Amer. Math. Monthly **109** (2002), 217–234.
- [4] J. PEČARIĆ, *Connections among some inequalities of Gauss, Steffensen and Ostrowski*, Southeast Asian Bull. Math. **13**, 2 (1989), 89–91.
- [5] P. RABIER, *Steffensen's inequality and  $L^1 - L^\infty$  estimates of weighted integrals*, Proc. Amer. Math. Soc. **140**, 2 (2012), 665–675.
- [6] J. F. STEFFENSEN, *On certain inequalities between mean values, and their application to actuarial problems*, Skand. Aktuarietidskr. **1** (1918), 82–97.