

NEW REFINEMENTS OF ACZÉL-TYPE INEQUALITIES AND THEIR APPLICATIONS

LAM T. T. TAM AND HUYNH M. HIEN*

Abstract. In this paper we provide new refinements of Aczél-type inequality and give some applications. Furthermore, we show that two of three theorems in the work by J. Tian and M.-H. Ha (J. Math. Inequal. **12** (1) (2018), 175–189) are incorrect whereas the proof of the other is technically wrong. We establish an improvement of the correctly stated theorem with a simple proof and give counterexamples to the wrong ones.

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REFERENCES

- [1] J. ACZÉL, *Some general methods in the theory of functional equations in one variable, New applications of functional equations*, Uspehi. Mat. Nauk (N. S.) **11** (3) (1956), 3–68 (in Russian).
- [2] Y. J. CHO, M. MATÍČ, J. PEČARIĆ, *Improvements of some inequalities of Aczél's type*, J. Math. Anal. Appl. **259** (2001) 226–240.
- [3] T. POPOVICIU, *On an inequality*, Gaz. Mat. Fiz. Ser. A **11** (64) (1959), 451–461 (in Romanian).
- [4] J. TIAN, *Reversed version of a generalized Aczél's inequality and its application*, J. Inequal. Appl. (2012), **2012**: 202.
- [5] J. TIAN, *New refinements of generalized Aczél's inequalities and their applications*, J. Math. Inequal. **10** (1) (2016), 247–259.
- [6] J. TIAN, M. H. HA, *Properties and refinements of Aczél-type inequalities*, J. Math. Inequal. **12** (1) (2018), 175–189.
- [7] P. M. VASIĆ, J. E. PEČARIĆ, *On the Jensen inequality for monotone functions*, An. Univ. Timisora Ser. St. Matematica **17** (1) (1979), 95–104.
- [8] P. M. VASIĆ, J. E. PEČARIĆ, *On Hölder and some related inequalities*, Mathematica Rev. D'Anal. Num. Th. L'Approx. **25** (1982), 95–103.
- [9] S. VONG, *On a generalization of Aczél's inequality*, Appl. Math. Lett. **24** (8) (2011), 1301–1307.
- [10] S. WU, *A unified generalization of Aczél, Popoviciu and Bellman's inequalities*, Taiwanese J. Math. **14** (4) (2010), 1635–1646.