

ON THE CAUCHY–SCHWARZ INEQUALITY AND SEVERAL INEQUALITIES IN AN INNER PRODUCT SPACE

NICUȘOR MINCULETE

Abstract. The aim of this article is to prove new results related to several inequalities in an inner product space. Among these inequalities we will mention Cauchy-Schwarz inequality. Moreover, we will obtain some applications of these inequalities.

Mathematics subject classification (2010): 46C05, 26D15, 26D10.

Keywords and phrases: Inner product space, Cauchy-Schwarz inequality.

REFERENCES

- [1] J. M. ALDAZ, *Strengthened Cauchy-Schwarz and Hölder inequalities*, JIPAM **10**, 4 (2009), art. 116.
- [2] A.-L. CAUCHY, *Cours d'Analyse de l'École Royale Polytechnique*, I Partie, Analyse Algébrique, Paris, 1821, reprinted by Ed. Jacques Gabay, Paris, 1989.
- [3] J. A. CLARKSON, *Uniformly convex spaces*, Trans. Amer. Math. Soc. **40** (1936), 396–414.
- [4] F. DADIPOUR, M. S. MOSLEHIAN, J. M. RASSIAS, S. E. TAKAHASI, *Characterization of a generalized triangle inequality in normed spaces*, Nonlinear Anal. **75** (2012), 735–741.
- [5] S. S. DRAGOMIR, *On Bessel and Grüss inequalities for orthonormal families in inner product spaces*, Bulletin of the Australian Mathematical Society **69**, 2 (2004), 327–340.
- [6] S. S. DRAGOMIR, *Some Grüss type inequalities in inner product spaces*, J. Inequal. Pure Appl. Math. **4** (2) (2003), art. 42.
- [7] S. S. DRAGOMIR, *A potpourri of Schwarz related inequalities in inner product spaces (II)*, J. Inequal. Pure Appl. Math. **7** (1) (2006), Article 14.
- [8] C. F. DUNKL, K. S. WILLIAMS, *A simple norm inequality*, The American Mathematical Monthly, vol. **71** (1964), 53–54.
- [9] A. KECHRINIOTIS, K. DELIBASIS, *On generalizations of Grüss inequality in inner product spaces and applications*, J. Inequal. Appl., vol. **2010**, Article ID 167091, 18 pages.
- [10] L. MALIGRANDA, *Simple Norm Inequalities*, The American Mathematical Monthly, vol. **113** (2016), 256–260.
- [11] J. L. MASSERA, J. J. SCHÄFFER, *Linear differential equations and functional analysis I*, Ann. of Math. **67** (1958), 517–573.
- [12] N. MINCULETE, R. PĂLTĂNEA, *Improved estimates for the triangle inequality*, J. Inequal. Appl. **2017**: 17 (2017).
- [13] D. S. MITRINOVIĆ, J. PEČARIĆ, A. M. FINK, *Classical and New Inequalities in Analysis*, Kluwer Academic, Dordrecht, 1992.
- [14] M. S. MOSLEHIAN, F. DADIPOUR, R. RAJIĆ, A. MARIĆ, *A glimpse at the Dunkl-Williams inequality*, Banach J. Math. Anal. **5** (2011), 138–151.
- [15] C. P. NICULESCU, L.-E. PERSSON, *Convex Functions and Their Applications. A Contemporary Approach*, CMS Books in Mathematics, 2nd ed., Springer, 2018.
- [16] J. PEČARIĆ, *On Hua's inequality in real inner product spaces*, Tamkang Journal of Mathematics, vol. **33**, No. 3 (2002), 265–268.
- [17] J. PEČARIĆ, B. TEPEŠ, *Improvement of a Grüss type discrete inequality in inner product spaces*, Bull. Math. Soc. Sc. Math. Roumanie, Tome **45** (93), no. 3–4 (2002), 199–208.
- [18] J. PEČARIĆ, R. RAJIĆ, *The Dunkl-Williams equality in pre-Hilbert C^* -modules*, Lin. Algebra Appl. **425** (2007), 16–25.

- [19] J. PEČARIĆ, R. RAJIĆ, *On some generalized norm triangle inequalities*, Rad HAZU, vol. **515** (2013), 43–52.