

## CONVERSE JENSEN INEQUALITY FOR STRONGLY CONVEX SET-VALUED MAPS

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*Abstract.* Integral and discrete counterparts of the converse Jensen inequality for strongly convex set-valued maps are presented.

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### REFERENCES

- [1] J.-P. AUBIN, H. FRANKOWSKA, *Set-Valued Analysis*, Birkhäuser, Boston-Basel-Berlin, 1990.
- [2] J. DIESTEL, J. J. UHL, JR., *Vector Measures*, Amer. Math. Soc., Providence, 1977.
- [3] H. HUANG, *Global error bounds with exponents for multifunctions with set constraints*, *Communications in Contemporary Math.* **12** (2010), 417–435.
- [4] M. KLARIČIĆ BAKULA, K. NIKODEM, *On the converse Jensen inequality for strongly convex functions*, *J. Math. Anal. Appl.* **434** (2016), 516–522.
- [5] H. LEIVA, N. MERENTES, K. NIKODEM AND J. L. SÁNCHEZ, *Strongly convex set-valued maps*, *J. Glob. Optim.* **57** (2013), 695–705.
- [6] J. MATKOWSKI, K. NIKODEM, *An integral Jensen inequality for convex multifunctions*, *Results Math.* **26** (1994), 348–353.
- [7] N. MERENTES AND K. NIKODEM, *Remarks on strongly convex functions*, *Aequationes Math.* **80** (2010), 193–199.
- [8] K. NIKODEM, *Strongly Convex Functions and Related Classes of Functions* in: Th. M. Rassias (Ed.) *Handbook of Functional Equations. Functional Inequalities, Springer Optimizations and Its Applications*, vol. 95, 2015, 365–405.
- [9] K. NIKODEM AND ZS. PÁLES, *Characterizations of inner product spaces by strongly convex functions*, *Banach J. Math. Anal.* **5** (2011), no. 1, 83–87.
- [10] K. NIKODEM, J. L. SÁNCHEZ, L. SÁNCHEZ, *Jensen and Hermite-Hadamard inequalities for strongly convex set-valued maps*, *Math. Aeterna* **4** (2014), 979–987.
- [11] E. S. POLOVINKIN, *Strongly convex analysis*, *Sbornik Mathematics* **187/2** (1996), 103–130.
- [12] B. T. POLYAK, *Existence theorems and convergence of minimizing sequences in extremum problems with restrictions*, *Soviet Math. Dokl.* **7** (1966), 72–75.
- [13] T. RAJBA, SZ. WĄSOWICZ, *Probabilistic characterization of strong convexity*, *Opuscula Math.* **31** (2011), 97–103.
- [14] R. SCHULTZ, *Strong convexity in stochastic programs with complete recourse*, *J. Comput. Appl. Math.* **56** (1994), 3–22.
- [15] J. P. VIAL, *Strong convexity of sets and functions*, *J. Math. Economy* **9** (1982), 187–205.