

SEMI-SMOOTH POINTS IN SPACE OF OPERATORS ON HILBERT SPACE

PAWEŁ WÓJCIK

Abstract. The investigations of the smooth points in the operator spaces $\mathcal{K}(\mathcal{H})$ and $\mathcal{L}(\mathcal{H})$ were started in [J. R. Holub, Math. Ann. **201** (1973), 157–163] and [T. J. Abatzoglou, Math. Ann. **239** (1979), 129–135]. The aim of this paper is to present a description of semi-smooth points in the operator spaces $\mathcal{L}(\mathcal{H}_1, \mathcal{H}_2)$ and $\mathcal{K}(\mathcal{H}_1, \mathcal{H}_2)$.

Mathematics subject classification (2010): 46B20, 46B28, 46C50, 47L05.

Keywords and phrases: Hilbert space, space of operators, norm derivatives, semi-smoothness.

REFERENCES

- [1] T. J. ABATZOGLOU, *Norm Derivatives on Spaces of Operators*, Math. Ann. **239** (1979), 129–135.
- [2] C. ALSINA, J. SIKORSKA, M. SANTOS TOMÁS, *Norm Derivatives and Characterizations of Inner Product Spaces*, World Scientific, Hackensack, NJ, 2010.
- [3] S. S. DRAGOMIR, *Semi-Inner Products and Applications*, Nova Science Publishers, Inc., Hauppauge, NY, 2004.
- [4] J. R. HOLUB, *On the Metric Geometry of Ideals of Operators on Hilbert Space*, Math. Ann. **201** (1973), 157–163.
- [5] P. M. Miličić, *Sur le semi-produit scalaire dans quelques espaces vectorial normés*, Mat. Vesnik, **8**(23) (1971), 181–185.
- [6] P. M. Miličić, *Sur les espaces semi-lisses*, Mat. Vesnik, **36** (1984), 222–226.
- [7] P. M. Miličić, *Sur la G-orthogonalité dans les espaces normés*, Mat. Vesnik, **39** (1987), 325–334.
- [8] D. SAIN, K. PAUL, A. MAL, A. RAY, *A complete characterization of smoothness in the space of bounded linear operators*, Linear and Multilinear Algebra, Volume 68, Issue 12, (2020), 2484–2494.
- [9] P. WÓJCIK, *Gateaux derivative of the norm in $\mathcal{K}(X, Y)$* , Ann. Funct. Anal. **7** (2016), no. 4, 678–685.
- [10] P. WÓJCIK, *Birkhoff orthogonality in classical M -ideals*, J. Aust. Math. Soc. **103** (2017), 279–288.
- [11] P. WÓJCIK, *Characterization of linear similarities through functional equation and mappings preserving orthogonalities*, Linear Algebra Appl., **579**, 2019, 206–216.