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MARKING MOMENTUM
FOR INNOVATION AND TECHNOLOGICAL TRANSFER

National Recovery and Resilience Plan
OF THE REPUBLIC OF BULGARIA

Advanced Variational Analysis and Applications (AVAA)

Research field: **Mathematics**

M. Krastanov, N. Ribarska, ***On the problem of calculus of variations with pure state constraints of equality type***, Math. Control & Related Fields (2025), WOS:001368717100001

Abstract. The basic problem of calculus of variations with pure state constraints of equality type in a non smooth setting is considered. Under suitable assumptions, a version of the Euler-Lagrange equation is obtained. Moreover, a generalization of the classical DuBois-Reymond Lemma is proved in the presence of pure state constraints.

N.A. Jork, N.P. Osmolovskii, **V.M. Veliov**, ***Strong metric (sub)regularity in optimal control,*** J. Conv. Anal. 32(2) (2025) 375-398, WOS:001413936200003

Abstract. This is mainly a survey on the properties of Strong Metric Regularity (SMR) and Strong Metric subRegularity (SMsR) of mappings representing first order optimality conditions (so-called optimality mappings) of optimization problems in infinite dimensional spaces. The focus is on the optimality mappings associated with optimal control problems for ODE systems or PDEs.

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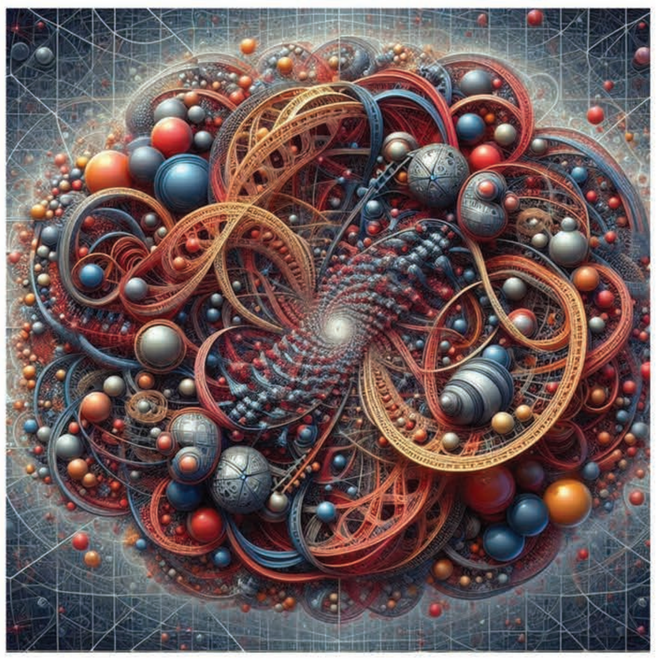
T. Manev, ***Fully closed mappings and LUR renormability***, Studia Mathematica, 278 (2024) 69-79, WOS:001338350300001

Abstract. We show that the space of continuous functions on a compact space X admits an equivalent pointwise lower semicontinuous locally uniformly rotund (LUR) norm whenever X admits a fully closed mapping π onto a compactum Y such that $C(Y)$ and the spaces $C(\pi^{-1}(y))$, $y \in Y$, all admit such norms. As a main corollary we show that $C(X)$ is LUR renormable whenever X is a Fedorchuk compact space of finite spectral height.

N. Ribarska, M. Tasheva, ***Transversality and strong tangential transversality of a finite number of sets***, J. Conv. Anal. 32(3) (2025) 767-788, WOS:001414490700008

Abstract. A definition of strong tangential transversality for a finite number of sets is proposed such that strong tangential transversality implies transversality. The main tool in the proofs are infinitesimal characterizations of transversality and subtransversality of a finite number of sets in the prime space which are of independent interest.



S. Apostolov, M. Bivas, ***Characterizations of metric (sub)regularity via (sub)transversality***, J. Conv. Anal. 32(4) (2025) 1241-1254

Abstract. Some classical characterizations of metric regularity and subregularity in a new and unified way are obtained.

M. Krastanov, B. Stefanov, ***A sufficient condition for a discrete-time optimal control problem,*** In: I. Lirkov, S. Margenov (eds) LSSC 2023, LNCS vol 13952 (2024) Springer, Cham, WOS:001279202200019

Abstract. A discrete-time optimal control problem is considered on an infinite-time horizon. A new sufficient optimality condition is proved under suitable assumptions.

J.A. Jaramillo, **M. Ivanov**, S. Lajara, **N. Zlateva**, ***Continuous selections and invertibility of nonsmooth maps between Banach spaces***, JOTA (2025)

Abstract. In the setting of Banach spaces, we address the problems of local surjectivity, existence of a continuous selection and invertibility for nonsmooth maps which admit a suitable pseudo-Jacobian. We obtain a general sufficient condition for the existence of a continuous section.

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