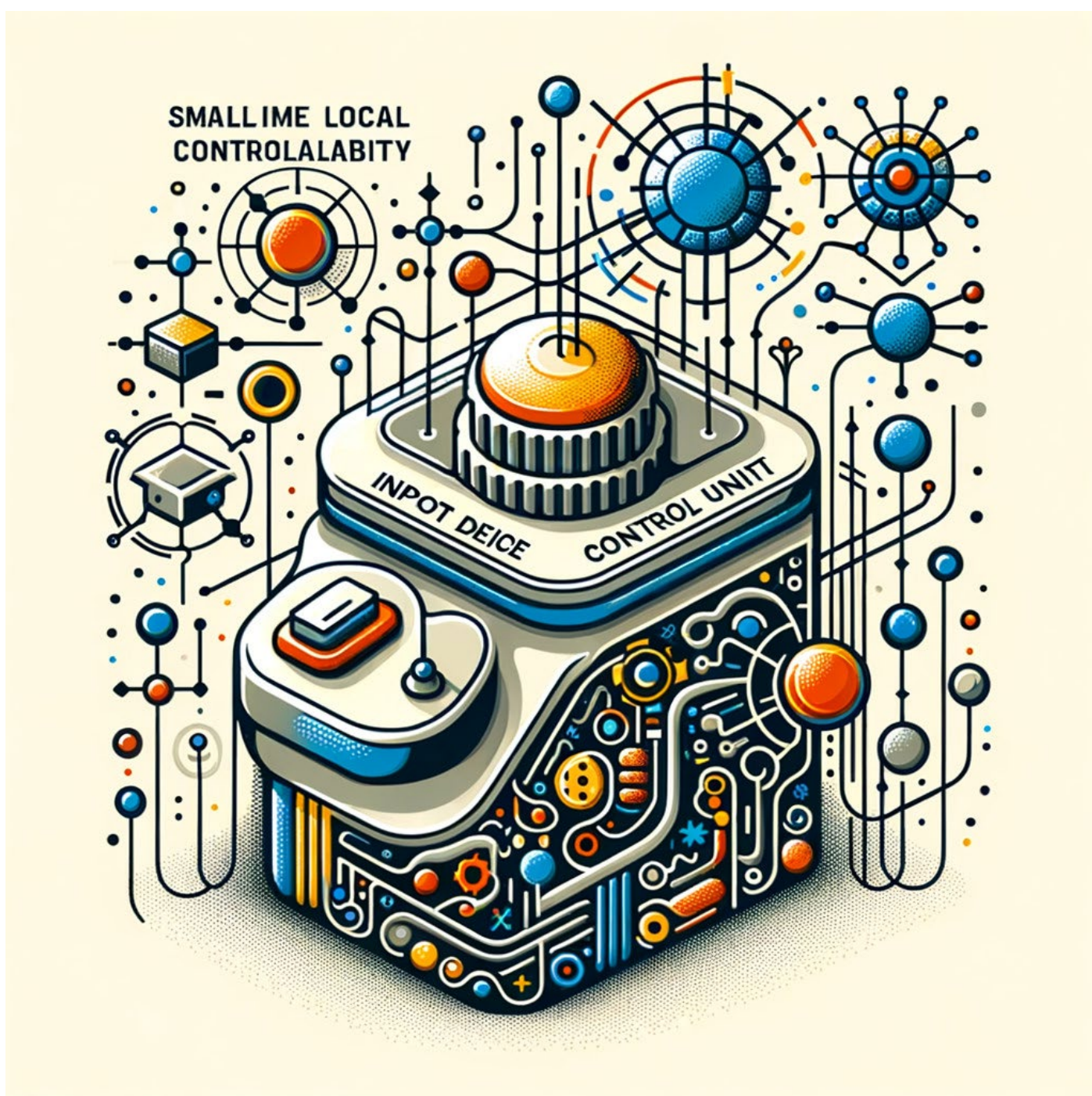


Advanced Variational Analysis and Applications (AVAA)

Research field: **Mathematics**

M. Krastanov, M. Nikolova,
On the small-time local controllability,
Systems & Control Letters, 177, art. No. 105535,
2023. WOS:001009329800001

Abstract. A class of polynomial control systems is considered. The local properties of the corresponding reachable sets are studied by using a general differential-geometrical approach based on the Campbell-Baker-Hausdorff formula. The main result is a new sufficient condition of small-time local controllability. Two four-dimensional examples illustrate this result.



D. Kamburova, R. Marinov, N. Zlateva,
Saddle points in completely regular topological spaces,
Vietnam Journal of Mathematics, March 2024.
WOS:001190451200001

Abstract. We give a characterization of completely regular topological spaces. Applying some recent results for supinf problems in completely regular topological spaces we establish a variational principle for saddle points. Well-posedness of saddle point problems is studied as well.



M. Ivanov, S. Troyanski, N. Zlateva,
Orlicz functions that do not satisfy the Δ_2 condition and high order Gateaux smoothness in $h_M(\Gamma)$, Proceedings of the AMS, Feb 2024.
WOS:001171438300001

Abstract. We study Orlicz functions that do not satisfy the Δ_2 condition at zero. We prove that for every Orlicz function M such that $\limsup_{t \rightarrow 0} M(t)/t^p > 0$ for some $p \geq 1$, there exists a positive sequence $T=(t_k)$ tending to zero and such that:

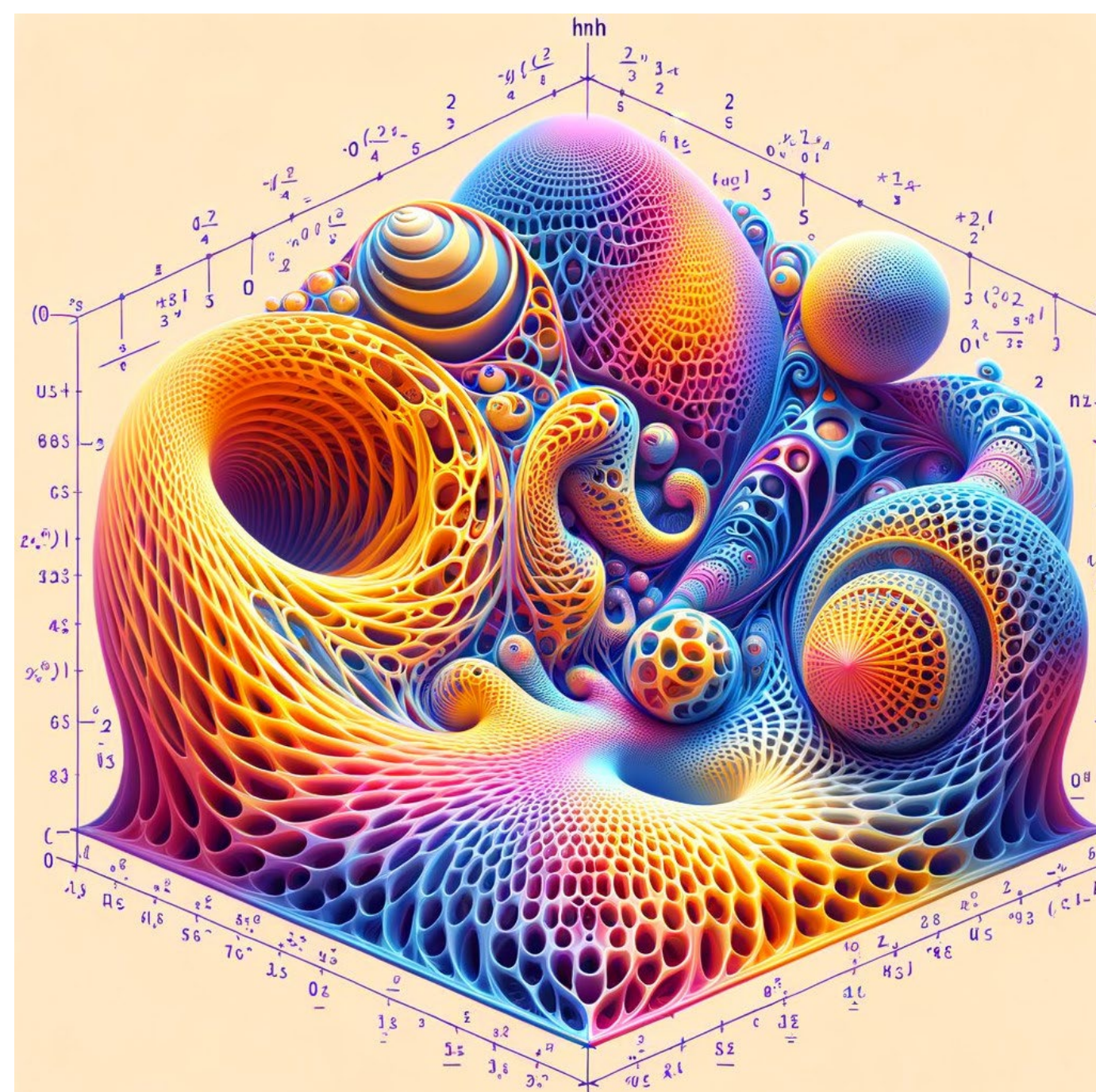
$$\sup_{k \in \mathbb{N}} M(ct_k)/M(t_k) < \infty, \text{ for all } c > 1, \text{ i.e., } M \text{ satisfies the } \Delta_2 \text{ condition with respect to } T.$$

Consequently, we show that for each Orlicz function with lower Boyd index $\alpha_M < \infty$ there exists an Orlicz function N such that:

(a) there exists a positive sequence $T=(t_k)$ tending to zero such that N satisfies the Δ_2 condition with respect to T , and

(b) the space h_N is isomorphic to a subspace of h_M generated by one vector.

We apply this result to find the maximal possible order of Gateaux differentiability of a continuous bump function on the Orlicz space $h_M(\Gamma)$ for Γ uncountable.

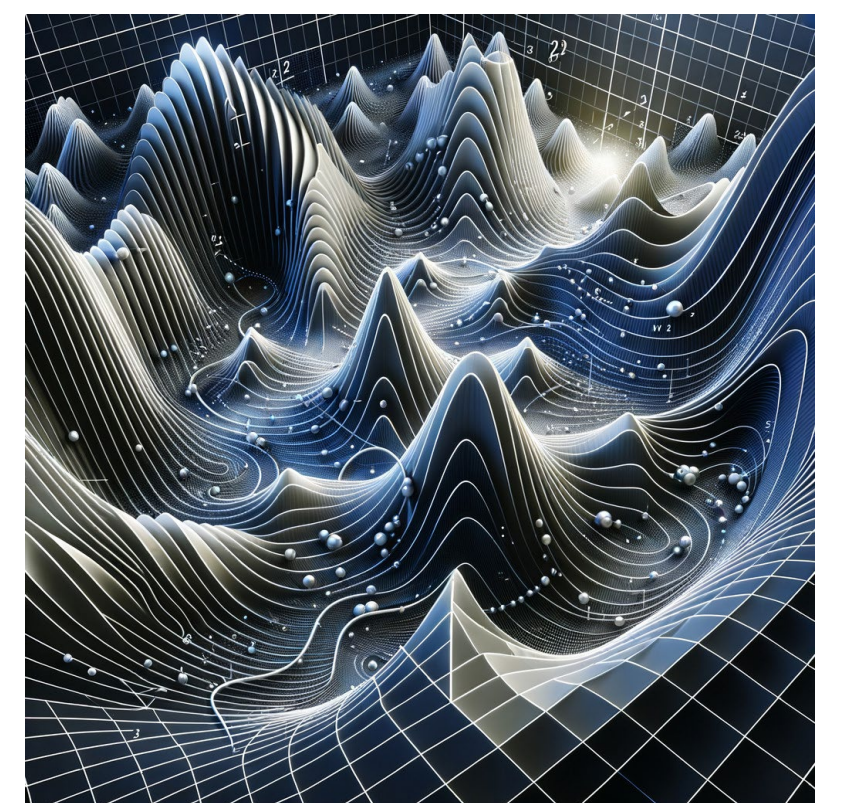


H. Topalova, N. Zlateva,
Perturbation method in Orlicz sequence spaces, Set-Valued and Variational Analysis, 2024, accepted.

Abstract. We develop a new perturbation method in Orlicz sequence spaces ℓ_M with Orlicz function M satisfying Δ_2 condition at zero. This result allows one to support from below any bounded below lower semicontinuous function with bounded support, with a perturbation of the defining function σ_M .

M. Ivanov, N. Zlateva,
Slopes and Moreau-Rockafellar theorem, Journal of Convex Analysis, 2024, accepted.

Abstract. Properties of local and global slopes of a function and its approximate critical points sets are studied in relation to determination of the function.



V. Shivarov, D. Grigorova, A. Yordanov,
Relative risk of death in Bulgarian cancer patients during the initial waves of the COVID-19 pandemic, Healthcare, 11 (18), art. No. 2594, 2023. WOS:001145376500001

Abstract. This study aims to assess whether Bulgarian cancer patients experienced a higher relative risk (RR) of death compared to the general Bulgarian population during the pandemic. The impact of the COVID-19 waves and predominant SARS-CoV-2 variants on RR was evaluated on various cancer types and age groups using a multiple linear regression approach. Surprisingly, the RR of death in cancer patients was lower during pandemic waves.



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Stoyan Apostolov, Mira Bivas, Denitsa Grigorova, Mihail Hamamdjiev, Martin Ivanov, Milen Ivanov, Nikolay Ivanov, Detelina Kamburova, Matey Konstantinov, Mikhail Krastanov, Todor Manev, Margarita Nikolova, Nadezhda Ribarska, Boyan Stefanov, Vesela Stoimenova, Maria Tasheva, Hristina Topalova, Vladimir Veliov, Nadia Zlateva, Tsvetomira Zlatkova