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A vectorial fixed point approach to nonlinear differential systems

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Abstract

In this work, we derive sufficient conditions ensuring both existence and multiplicity of solutions for nonlinear differential systems via fixed point theory in cones. These conditions arise by rewriting the original problem as an equivalent fixed point problem for compact operators of the form $T = (T_1, T_2)$ defined on the product space $X_1 \times X_2$.
Recent contributions [1, 2, 3] have developed several versions of Krasnosel'skii-type fixed point theorems that impose conditions in a component-wise manner for operators of this type. Our existence results are based on fixed point theorems that follow this same philosophy.

References

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[2] R. Precup, A vector version of Krasnosel'skii's fixed point theorem in cones and positive periodic solutions of nonlinear systems, *J. Fixed Point Theory Appl.*, **2** (2007) 141–151.

[3] J. Rodríguez-López, A fixed point index approach to Krasnosel'skii-Precup fixed point theorem in cones and applications, *Nonlinear Anal.*, **226** (2023), No. 113138, 1–19.

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