

ON A SECOND-ORDER DIFFERENTIAL INCLUSION WITH
CERTAIN INTEGRAL AND MULTI-STRIP BOUNDARY
CONDITIONS

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Abstract. We study a second-order differential inclusion with integral and multi-strip boundary conditions defined by a set-valued map with nonconvex values. We obtain an existence result and we prove the arcwise connectedness of the solution set of the considered problem.

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REFERENCES

- [1] B. Ahmad, A. Alsaedi, M. Alsulami and S.K. Ntouyas, *Second-order ordinary differential equations and inclusions with a new kind of integral and multi-strip boundary conditions*, Differ. Equ. Appl., **11** (2019), 183–202.
- [2] J.P. Aubin and H. Frankowska, *Set-valued Analysis*, Birkhäuser, Basel, 1990.
- [3] A. Cernea, *Some remarks on a fractional differential inclusion with non-separated boundary conditions*, Electron. J. Qual. Theory Differ. Equ., **45** (2011), 1–14.
- [4] A. Cernea, *Some remarks on a multi point boundary value problem for a fractional order differential inclusion*, J. Appl. Nonlinear Dyn., **2** (2013), 151–160.
- [5] A.F. Filippov, *Classical solutions of differential equations with multivalued right hand side*, SIAM J. Control Optim., **5** (1967), 609–621.
- [6] K. Kuratowski and C. Ryll-Nardzewski, *A general theorem on selectors*, Bull. Acad. Pol. Sci., **13** (1965), 397–403.
- [7] S. Marano, *Fixed points of multivalued contractions with nonclosed, nonconvex values*, Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl., **5** (1994), 203–212.
- [8] S. Marano and V. Staicu, *On the set of solutions to a class of nonconvex nonclosed differential inclusions*, Acta Math. Hungar., **76** (1997), 287–301.

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