
ON A VIABILITY RESULT FOR DIFFERENTIAL INCLUSIONS WITH STIELTJES DERIVATIVE

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We present a viability result for the following Initial Value Problem involving the Stieltjes derivative with respect to a left-continuous non-decreasing function $g : [0, 1] \rightarrow \mathbb{R}$:

$$\begin{cases} u'_g(t) \in F(t, u(t)), \mu_g - a.e. \ t \in [0, 1) \\ u(t) \in K(t), \quad \forall t \in [0, 1] \\ u(0) = x_0 \in K(0) \end{cases}$$

where

$$K : [0, 1] \rightarrow \mathcal{P}_{cc}(\mathbb{R}^d), \quad F : [0, 1] \times \mathbb{R}^d \rightarrow \mathcal{P}_{cc}(\mathbb{R}^d) \quad (d \geq 1)$$

are convex compact-valued maps.

By μ_g one denotes the Lebesgue-Stieltjes measure generated by g on $[0, 1]$.

Based on the above result, a Filippov-type lemma for Stieltjes differential inclusions is formulated.

References: B. Satco, G. Smyrlis, *Viability and Filippov-type lemma for Stieltjes differential inclusions*, Set-Valued and Variational Analysis 31(3), 2023.

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