

Regularity properties of attainable sets in control theory

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Abstract: The attainable set at time $T > 0$ from a given closed set K , $A(K;T)$, is well-known to be a highly irregular object. In my first lecture, for a control system $x' = f(x, u)$ whose set of admissible velocities has the interior sphere property, I will discuss a joint result with H. Frankowska that guarantees that $A(K;T)$ retains the same property. I will also describe applications to time optimal control problems with a general target. Then, in my second lecture, I will apply the interior sphere property of $A(K;T)$ to symmetric systems $x' = f(x)u$, showing that $A(K;T)$ has finite perimeter and obtaining sharp estimates for the time evolution of such a boundary measure. This is a joint result with P. Cardaliaguet that can be applied to dislocation dynamics.