NECESSARY CONDITIONS FOR SOLVING INITIAL VALUE PROBLEMS WITH INFIMA OF SUPERFUNCTIONS

RODRIGO LÓPEZ POUSO

Abstract. Goodman proved that the pointwise infimum of all superfunctions is the minimal absolutely continuous solution of

\[ x' = f(t,x), \quad t \in [0,1], \quad x(0) = 0, \]

in case \( f \) is a \( L^1 \)-bounded Carathéodory function. How far can Carathéodory conditions be weakened without losing that property? First we establish necessary conditions over \( f \) for Goodman’s method to be valid, and then we use them as a starting point to deduce sufficient ones. In this way we obtain new existence results and we provide new insights concerning the application of Goodman’s method.

Key words and phrases: subfunctions, superfunctions, discontinuous differential equations.

REFERENCES