Krajc, Bohumil

On bounded solutions in a given set of systems of differential equations. (English)

Zbl 1045.34012
J. Inequal. Appl. 6, No. 2, 149-165 (2001).

This paper deals with entirely bounded solutions in a given set of systems of differential equations $x' = f(t,x)$, where $x = (x_1, \cdots, x_n)$ and $f = (f_1, \cdots, f_n)$ is a continuous vector function which is defined in $\mathbb{R}^{1+n}$. A solution of the given system is said to be entirely bounded if $sup_{t\in\mathbb{R}}|x(t)| < +\infty$. By developing the techniques in *J. Andres* and *B. Krajc* [J. Comput. Appl. Math. 113, No. 1–2, 73–82 (1999; Zbl 0944.34012)], which consist mainly in invariantness of prescribed sets and transversality arguments on their boundaries, the author proves the existence of bounded solutions to the given systems. On the basis of this result, several bounded solutions separated in different domains are also obtained. This conclusion can be applied to show the existence of bounded solutions of the equation $x' = a(t)x + g(t,x)$, where $a \in C(\mathbb{R},\mathbb{R})$, $g \in (\mathbb{R}\times\mathbb{R},\mathbb{R})$ by imposing some conditions on the functions a and g. For related works, one can see *J. Andres* [J. Differ. Equations 155, No. 2, 285–310 (1999; Zbl 0940.34008)].

Reviewer: Zaihong Wang (Beijing)

MSC:

34C11 Growth and boundedness of solutions to ordinary differential equations

Full Text: DOI EuDML