Bartušek, Miroslav

On existence of singular solutions of n-th order differential equations. (English)

Zbl 1090.34536
Arch. Math., Brno 36, Suppl., 395-404 (2000).

The author considers the n-th order differential equation

$$y^{(n)} = f(t, y, y', \dots, y^{(n-2)})g(y^{(n-1)}) \tag{1}$$

where $n \geq 2$, $f \in C^0([0,\infty) \times \mathbb{R}^{n-1})$, $g \in C^0(\mathbb{R})$, $\alpha f(t, x_1, \dots, x_{n-1})x_1 > 0$ for $x_1 \neq 0$ with $\alpha \in \{-1, 1\}$ and $g(x) \geq 0$ for $x \in \mathbb{R}$. A solution $y(t)$ of (1) defined on $[T, \tau) \subset [0, \infty)$ is called singular if $\tau < \infty$ and $y(t)$ cannot be defined for $t = \tau$. The paper presents sufficient conditions under which (1) has a singular solution $y : [T, \tau) \to \mathbb{R}$ satisfying $\lim_{t\to\tau_-} y^{(i)}(t) = c_i \in \mathbb{R}$, $i = 0, 1, \dots, n-2$ and $\lim_{t\to\tau_-} |y^{(n-1)}(t)| = \infty$.

Reviewer: Svatoslav Staněk (Olomouc)

MSC:

34C11 Growth and boundedness of solutions to ordinary differential equations | Cited in **1** Document

Keywords:

singular solution; black hole solution

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