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Abstracts of Short Communications and Posters

Section:

9. Ordinary Differential Equations and Dynamical Systems

1991 MS Classification: 34B15

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On explosive kneser solutions of nonlinear ordinary differential equations.

The differential equation

$$u^{(n)} = f(t, u, \dots, u^{(n-1)}) \tag{1}$$

is considered, where $n \geq 2$ and $f : R_+ \times R^n \to R$ is a continuous function. The sufficient conditions are found under which this equation has a solution satisfying the conditions

$$\lim_{t \to +\infty} u(t) = +\infty, \quad (-1)^i u^{(i)}(t) > 0 \quad (i = 0, 1, \dots, n-1) \quad \text{for} \quad t > 0 \tag{2}$$

and global two-sided estimates for such solutions are obtained.
In particular, it is shown that if

$$p_1 t^\mu |x_1|^\lambda \leq (-1)^n f(t, x_1, \dots, x_n) \leq p_2 t^\mu |x_1|^\lambda,$$

where $\mu > -n$, $\lambda > 1$ and $p_2 \geq p_1 > 0$, then problem (1), (2) is solvable and every its solution admits the estimates

$$r_2 p_2^{\frac{1}{1-\lambda}} t^{\frac{n+\mu}{1-\lambda}} \leq u(t) \leq r_1 p_1^{\frac{1}{1-\lambda}} t^{\frac{n+\mu}{1-\lambda}} \quad \text{for} \quad t > 0,$$

where r_1 and r_2 are constants depending only on λ, μ and n.