On Asymptotic Behaviors of Solution of Essentially Nonlinear Functional-Differential Equations

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Consider the following differential equation

$$u^{(n)}(t) + p(t)\left|u(\sigma(t))\right|^{\mu(t)} \operatorname{sign} u(\sigma(t)) = 0,$$

where $n \geq 2$, $p \in L_{\text{loc}}(R_+; R)$, $\mu \in C(R_+; (0, +\infty))$, $\sigma \in C(R_+; R_+)$ and $\lim_{t \to +\infty} \sigma(t) = +\infty$.

We used to succeed in obtaining such results for the equation which as a rule were new for linear and Emden-Fowler nonlinear arbitrary differential equations as well. It is an interesting fact that investigation of such general equations enabled me to single out new classes (almost linear and essentially nonlinear) of ordinary differential equations which had not been considered earlier. The sufficient (necessary and sufficient) conditions are established for oscillation of solution.