On a periodic problem for higher-order differential equations with a deviating argument

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Let ω be a prescribed positive number. Consider higher-order differential equations with the deviating argument

$$u^{(n)}(t) = p(t)u(\tau(t)) + q(t)$$

and

$$u^{(n)}(t) = f(t, u(\tau(t))) + f_0(t),$$

where $p, q, f_0 \colon \mathbb{R} \to \mathbb{R}$ are ω-periodic functions which are Lebesgue integrable on the interval $[0, \omega]$, $f \colon \mathbb{R} \times \mathbb{R} \to \mathbb{R}$ is a function from the Carathéodory class such that $f(t, 0) \equiv 0$, $f(t + \omega, x) = f(t, x)$, $\tau \colon \mathbb{R} \to \mathbb{R}$ is measurable on every bounded interval, and $\frac{\tau(t+\omega)-\tau(t)}{\omega}$ is an integer for almost all $t \in \mathbb{R}$.

For the mentioned nonautonomous linear and nonlinear differential equations, new sufficient conditions of the existence and uniqueness of an ω-periodic solution are found.

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