Wong, P. J. Y.; **Agarwal, R. P.**

The oscillation of an mth order perturbed nonlinear difference equation. (English)

Zbl 0870.39001
Arch. Math., Brno 32, No. 1, 13-27 (1996).

The authors consider the equation $|\Delta^m y(k)|^{\alpha-1}\Delta^m y(k) + Q(k, y(k-\sigma_k)) = P(k, y(k-\sigma_k))$, $k \geq k_0$, where $\alpha > 0$, Δ is the forward difference operator defined by $\Delta y(k) = y(k+1) - y(k)$, $Q(k, z(j))$ and $P(k, z(j))$ are functions depending on k, and $\Delta^i(z(j))$ for $0 \leq i \leq m-2$, or $0 \leq i \leq m-1$, respectively, and σ_k is an integer such that $\lim(k - \sigma_k) = \infty$.

They provide some criteria for oscillation of the solutions. A typical result: Assume that f is a real function, $uf(u) > 0$ for $u \neq 0$, and $\{q(k)\}, \{p(k)\}$ are real sequences such that $Q(k, x(k-\sigma_k))/f(x(k-\sigma_k) \geq q(k)$, $P(k, x(k-\sigma_k))/f(x(k-\sigma_k) \leq p(k)$, and $\lim |q(k) - p(k)| \geq 0$. If $m = 1$ or m is even, f is continuous, $\liminf_{|u|\to\infty} f(u) > 0$ and $\sum_k [q(k) - p(k)]^{1/\alpha} = \infty$, then all solutions are oscillatory.

Reviewer: J.Smítal (Opava)

MSC:

39A10 Additive difference equations

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