Oscillation criteria for second-order nonlinear difference equations of Euler type

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The purpose of this talk is to present a pair of an oscillation theorem and a nonoscillation theorem for the second-order nonlinear difference equation

$$\Delta^2 x(n) + \frac{1}{n(n+1)} f(x(n)) = 0, \tag{1}$$

where $f(x)$ is continuous on $\mathbb{R}$ and satisfies the signum condition $xf(x) > 0$ if $x \neq 0$. The obtained results are best possible in a certain sense. Proof is given by means of Riccati technique and phase plane analysis of a system. A discrete version of the Riemann-Weber generalization of the Euler-Cauchy differential equation plays an important role to prove our results.

References

[1] O. Došlý and N. Yamaoka, *Oscillation constants for second-order ordinary differential equations related to elliptic equations with p-Laplacian*, Nonlinear Anal. 113 (2015) 115–136.

[2] W. Kelley and A. Peterson, Difference Equations: An Introduction with Applications, 2nd ed., Harcourt/Academic Press, San Diego, 2001.

[3] N. Yamaoka, *Oscillation criteria for second-order nonlinear difference equations of Euler type*, Adv. in Difference Equ. 2012, 2012:218, 14pp.