On sequences of large homoclinic solutions for a difference equations on the integers

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In this talk we will show that there is a concrete interval of positive parameters λ, for which we prove the existence of infinitely many homoclinic solutions for a discrete problem

$$-\Delta\phi_p(\Delta u(k-1)) + a(k)\phi_p(u(k)) = \lambda f(k, u(k)), \quad k \in \mathbb{Z},$$

where the nonlinear term $f : \mathbb{Z} \times \mathbb{R} \to \mathbb{R}$ has an appropriate behavior at infinity, without any symmetry assumptions, $p > 1$ is a real number, $\phi_p(t) = |t|^{p-2}t$ for all $t \in \mathbb{R}$ and $a : \mathbb{Z} \to \mathbb{R}$ is a positive weight function. The approach is based on a general critical points theorem due to Bonanno and Molica Bisci [1], that is generalization of result of Ricceri [2].

[1] G. Bonanno, G. Molica Bisci, Infinitely many solutions for a boundary value problem with discontinuous nonlinearities, *Bound. Value Probl.*, **2009** (2009), 1–20.

[2] B. Ricceri, A general variational principle and some of its applications, *J. Comput. Appl. Math.* **133** (2000), 401-410.