Principal solutions in oscillation theory of linear Hamiltonian systems

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This is a joint work with Peter Šepitka (Masaryk University, Brno). Principal solutions represent a central object in the oscillation theory of differential equations or systems. In this talk we consider a general (possibly not controllable) linear Hamiltonian system. For such a system its solutions (or conjoined bases) may naturally arise with noninvertible components. For this general case we introduce the concept of a principal solution at infinity and study its oscillation properties in terms of left and right proper focal points. We incorporate the comparative index introduced by J. Elyseeva (2007), which was earlier used in the discrete oscillation theory. We relate the notion of a principal solution at infinity with a widely used concept of a principal solution at a finite point and show important consequences of this relation for the oscillation theory.

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References

[1] P. Šepitka, R. Šimon Hilscher, Minimal principal solution at infinity for nonoscillatory linear Hamiltonian systems, *J. Dynam. Differential Equations* **26** (2014), no. 1, 57–91.

[2] P. Šepitka, R. Šimon Hilscher, Principal solutions at infinity of given ranks for nonoscillatory linear Hamiltonian systems, *J. Dynam. Differential Equations* **27** (2015), no. 1, 137–175.

[3] P. Šepitka, R. Šimon Hilscher, Principal and antiprincipal solutions at infinity of linear Hamiltonian systems, *J. Differential Equations* **259** (2015), no. 9, 4651–4682.

[4] P. Šepitka, R. Šimon Hilscher, Genera of conjoined bases of linear Hamiltonian systems and limit characterization of principal solutions at infinity, *J. Differential Equations* **260** (2016), no. 8, 6581–6603.

[5] P. Šepitka, R. Šimon Hilscher, Comparative index and Sturmian theory for linear Hamiltonian systems, *J. Differential Equations* **262** (2017), no. 2, 914–944.

[6] P. Šepitka, R. Šimon Hilscher, Focal points and principal solutions of linear Hamiltonian systems revisited, submitted (2017).