Graduate

Analysis Seminar

Massera's theorems for various types of equations with discontinuous solutions

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Mathematics Department Auditorium

Abstract. In 1950, Massera published an article on the existence of periodic solutions for ordinary differential equations. Since then, this result has been studied and extended to other classes of equations, such as differential equations on time scales.

In this seminar, we present new Massera-type theorems for generalized ordinary differential equations. We also use the correspondence of this equations with various types of equations to also establish new Massera-type theorems for measure differential equations, impulsive equations and also dynamic equations on time scales.

For scalar nonlinear equations, we find sufficient conditions that imply that bounded solution converge asymptotically to a periodic solution. For linear systems of differential equations, we find other sufficient conditions such that the existence of periodic solutions are guaranteed whenever there is a bounded solution.

References

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[2] J. Kurzweil, *Generalized Ordinary Differential Equations. Not Absolutely Continuous Solutions*, World Scientific, 2012.

[3] J. L. Massera, *The existence of periodic solutions of systems of differential equations*, Duke Math. J. 17 (1950), 457–475.

[4] A. Slavík, *Dynamic equations on time scales and generalized ordinary differential equations*, J. Math. Anal. Appl. 385 (2012), 534–550.

[5] S. Schwabik, *Generalized Ordinary Differential Equations*, World Scientific, 1992.