

Asymptotic analysis of positive decreasing solutions of a class of systems of second order nonlinear differential equations in the framework of regular variation

Tomoyuki Tanigawa

Department of Mathematics, Faculty of Education, Kumamoto University, Japan
tanigawa@educ.kumamoto-u.ac.jp

In this talk we consider two-dimensional nonlinear differential systems of the form

$$(A) \quad x'' = p_1(t)x^{\alpha_1} + q_1(t)y^{\beta_1}, \quad y'' = p_2(t)x^{\alpha_2} + q_2(t)y^{\beta_2},$$

where α_i and β_i , $i = 1, 2$ are positive constants and $p_i(t)$ and $q_i(t)$, $i = 1, 2$ are continuous regularly varying functions on $[a, \infty)$. Two kinds of criteria are established for the existence of strongly decreasing regularly varying solutions with negative indices of (A) with precise asymptotic behavior at infinity. Fixed point technique and basic theory of regular variation are utilized for this purpose.

This is a joint work with Professor Jaroslav Jaroš (Comenius University) and Professor Kusano Takaši (Fukuoka University).

References

- [1] *J. Jaroš, T. Kusano*: Existence and precise asymptotic behavior of strongly monotone solutions of systems of nonlinear differential equations. *Differ. Equ. Appl.* 5 (2013), 185–204.
- [2] *J. Jaroš, T. Kusano*: Asymptotic behavior of positive solutions of a class of systems of second order nonlinear differential equations. *Electron. J. Qual. Theory Differ. Equ.* no. 23 (2013), 1–23.
- [3] *J. Jaroš, T. Kusano, T. Tanigawa*: Asymptotic analysis of positive solutions of a class of third order nonlinear differential equations in the framework of regular variation. *Math. Nachr.* 286 (2013), 205–223.
- [4] *T. Kusano, J. Manojlović*: Positive solutions of fourth order Emden-Fowler type differential equations in the framework of regular variation. *Appl. Math. Comput.* 218 (2012), 6684–6701.
- [5] *V. Marić*: Regular Variation and Differential Equations. *Lecture Notes in Mathematics* 1726, Springer-Verlag, Berlin, 2000.