

LYAPUNOV-TYPE INEQUALITY FOR QUASILINEAR SYSTEMS WITH ANTI-PERIODIC BOUNDARY CONDITIONS

MUSTAFA FAHRI AKTAŞ, DEVRİM ÇAKMAK AND AYDIN TIRYAKI

Abstract. In this paper, we establish a new Lyapunov-type inequality for quasilinear systems with the anti-periodic boundary conditions. It improves some result of Wang [17]. As an application, we also obtain lower bounds for the eigenvalues of corresponding systems.

Mathematics subject classification (2010): 34C10, 34B15, 34L15.

Keywords and phrases: Lyapunov-type inequality, anti-periodic boundary condition, lower bound.

REFERENCES

- [1] G. A. AFROUZI, S. HEIDARKHANI, *Existence of three solutions for a class of Dirichlet quasilinear elliptic systems involving the (p_1, p_2, \dots, p_n) -Laplacian*, *Nonlinear Anal.* **70** (2009), 135–143.
- [2] M. F. AKTAŞ, D. ÇAKMAK, A. TIRYAKI, *A note on Tang and He's paper*, *Appl. Math. Comput.* **218** (2012), 4867–4871.
- [3] A. CANADA, J. A. MONTERO, S. VILLEGAS, *Lyapunov inequalities for partial differential equations*, *J. Funct. Anal.* **237** (2006), 176–193.
- [4] A. CANADA, S. VILLEGAS, *Optimal Lyapunov inequalities for boundary value problems*, *J. Math. Inequal.* **3** (2009), 631–643.
- [5] D. ÇAKMAK, *Lyapunov-type integral inequalities for certain higher order differential equations*, *Appl. Math. Comput.* **216** (2010), 368–373.
- [6] D. ÇAKMAK, A. TIRYAKI, *On Lyapunov-type inequality for quasilinear systems*, *Appl. Math. Comput.* **216** (2010), 3584–3591.
- [7] D. ÇAKMAK, A. TIRYAKI, *Lyapunov-type inequality for a class of Dirichlet quasilinear systems involving the (p_1, p_2, \dots, p_n) -Laplacian*, *J. Math. Anal. Appl.* **369** (2010), 76–81.
- [8] D. ÇAKMAK, *On Lyapunov-type inequality for a class of nonlinear systems*, *Math. Inequal. Appl.* **16** (2013), 101–108.
- [9] L. Y. CHEN, C. J. ZHAO, W. S. CHEUNG, *On Lyapunov-type inequalities for two-dimensional nonlinear partial systems*, *J. Inequal. Appl.* 2010, Art. ID 504982, 12 pp.
- [10] P. HARTMAN, *Ordinary Differential Equations*, Wiley, New York, 1964 an Birkhauser, Boston 1982.
- [11] A. M. LIAPUNOV, *Problème général de la stabilité du mouvement*, *Ann. Fac. Sci. Univ. Toulouse*, **2** (1907), 203–407.
- [12] P. L. NAPOLI, J. P. PINASCO, *Estimates for eigenvalues of quasilinear elliptic systems*, *J. Differential Equations* **227** (2006), 102–115.
- [13] X. H. TANG, X. HE, *Lower bounds for generalized eigenvalues of the quasilinear systems*, *J. Math. Anal. Appl.* **385** (2012), 72–85.
- [14] A. TIRYAKI, D. ÇAKMAK, M. F. AKTAŞ, *Lyapunov-type inequalities for a certain class of nonlinear systems*, *Comput. Math. Appl.*, **64** (2012), 1804–1811.
- [15] X. YANG, Y. KIM, K. LO, *Lyapunov-type inequality for n -dimensional quasilinear systems*, *Math. Inequal. Appl.* **16** (2013), 929–934.
- [16] X. YANG, Y. KIM, K. LO, *Lyapunov-type inequality for quasilinear systems*, *Appl. Math. Comput.* **219** (2012), 1670–1673.
- [17] Y. WANG, *Lyapunov-type inequalities for certain higher order differential equations with anti-periodic boundary conditions*, *Appl. Math. Letters* **25** (2012), 2375–2380.