

NONLINEAR INTEGRAL INEQUALITIES OF BIHARI-TYPE WITHOUT CLASS H

SUNG KYU CHOI, SHENGFU DENG, NAM JIP KOO AND WEINIAN ZHANG

Abstract. Integral inequalities of Bihari-type without restriction to the class H are discussed. The main result can be applied to generalize Pinto's results and Choi *et al*'s results. It is also applied to show boundedness of solutions of a functional differential equation.

Mathematics subject classification (2000): 34C45, 34C40.

Key words and phrases: Integral inequality, Bihari's type, Class H , Monotonicity, Boundedness.

REFERENCES

- [1] R. P. AGARWAL, E. THANDAPANI, *Remarks on generalizations of Gronwall's inequality*, Chinese J. Math., **9**, (1981), 1–22.
- [2] D. BAINOV, P. SIMEONOV, *Integral Inequalities and Applications*, Kluwer Academic Press, Dordrecht, 1992.
- [3] R. BELLMAN, *Stability Theory of Differential Equations*, McGraw-Hill, New York, 1953.
- [4] I. A. BIHARI, *A generalization of a lemma of Bellman and its application to uniqueness problem of differential equation*, Acta Math. Acad. Sci. Hungar., **7**, (1956), 71–94.
- [5] S. K. CHOI, Y. H. GOO AND N. J. KOO, *Lipschitz and exponential asymptotic stability for nonlinear functional differential systems*, Dynamic Systems and Applications, **6**, (1997), 397–410.
- [6] F. DANNAN, *Integral inequalities of Gronwall-Bellman-Bihari type and asymptotic behavior of certain second order nonlinear differential equations*, J. Math. Anal. Appl., **108**, (1985), 151–164.
- [7] U. D. DHONGADE, S. G. DEO, *A nonlinear generalization of Bihari's inequality*, Proc. Amer. Math. Soc., **54**, (1976), 211–216.
- [8] J. K. HALE, *Theory of Functional Differential Equations*, Springer-Verlag, New York, 1977.
- [9] V. LAKSHMIKANTHAM, M. R. M. RAO, *Theory of Integro-Differential Equations*, Gordon and Breach Science Publ., Switzerland, 1995.
- [10] R. MEDINA, M. PINTO, *On the asymptotic behavior of solutions of a class of second order nonlinear differential equations*, J. Math. Anal. Appl., **135**, (1988), 399–405.
- [11] B. G. PACHPATTE, *A note on Gronwall-Bellman inequality*, J. Math. Anal. Appl., **44**, (1973), 758–762.
- [12] B. G. PACHPATTE, *On some generalization of Bellman's lemma*, J. Math. Anal. Appl., **51**, (1975), 141–150.
- [13] B. G. PACHPATTE, *Inequalities for Differential and Integral Equations*, Academic Press, London, 1998.
- [14] M. PINTO, *Perturbations of asymptotically stable differential systems*, Analysis, **4**, (1984), 161–175.
- [15] M. PINTO, *Integral inequalities of Bihari-type and applications*, Funkcial. Ekvac., **33**, (1990), 387–403.
- [16] W. ZHANG, *Generalized exponential dichotomies and invariant manifolds for differential equations*, Adv. Math. Chin., **22**, (1993), 1–45.
- [17] W. ZHANG, S. DENG, *Projected Gronwall-Bellman's inequality for integrable functions*, Math. Comput. Modelling, **34**, (2001), 393–402.