An improvement algorithm for target tracking by using recursive computation method

陳錫立、鍾翼能

E-mail: 9223462@mail.dyu.edu.tw

ABSTRACT

In the multi-target tracking systems, there are many disturbances from the outside environments to influence the estimated correctness. Therefore, it is important to design a new structure of the radar systems to amend the systems ’ parameters, then, to obtain the better performance. In this article, we proposed an improved filter to track the maneuvering targets well. This filter constructs of the extended Kalman filter and the adaptive procedure, and integrates the related techniques included one-step conditional maximum likelihood, recursive computation method, and multi-observation. By this way, we can diminish the errors resulted from producing maneuvering targets, then, the systems will get the better tracked outcome.

Keywords : extended Kalman filter ; recursive computation method ; adaptive procedure ; multi-observation

Table of Contents

REFERENCES

1. S. Blackman, ”Multiple Target Tracking With Radar Applications, ” Artech House, 1986 2. Y. Bar-Shalom, and T.E. Formann, “ Tracking and Data Association, ” Artech House,1988. 3. Y.N. Chung, D.L. Gustafson, and E. Emre, “ Extended Solution to Multiple Maneuvering Target Tracking, ” IEEE Trans. Aerosp. Electron. Syst. Vol. AES-25, pp.876-887,1990. 4. Y. Bar-Shalom and T. Edsion, “ Sonar Tracking of Multiple Targets Using Joint Probabilistic Data Association, ” IEEE Journal of Oceaning Engineering, Vol. OE-8, No.3, 1983. 5. S. Kingsley and S. Quegan., “ Understand Radar Systems, ” McGRAW-HILL book Co.1992. 6. E. Emre, and J. Seo, ” A Unifying Approach to Multi-Target Tracking , ” IEEE. Trans. Aerosp. Electron. Syst., Vol. AES-25, pp. 520-528, 1989. 7. R.A. Singer, ” Estimating Optimal Tracking Filter Performance for Manned Maneuvering Targets, ” IEEE Trans. On Aerosp. and Electron. Syst., Vol. AES-5, pp. 473-483, July 1970. 8. Bar-Shalom, Y. , ” Tracking Methods in a Multi-Target Environment, ” IEEE Trans. Automa. Contr. , Vol., AC-23, pp. 618-626, Aug.1978. 9. Stein, J. J. , and S.S. Blackman , ” Generalized Correlation of Multi-Target Tracking Data, ” IEEE Transactions on Aerospace and Electronic Systems, AES-II, Nov. 1975, pp. 1207-1217. 10. Sea, R. G., ” Optimal Correlation of Sensor Data with Tracks in Surveillance Systems, ” Proceeding of Sixth International Conference on Systems Sciences, Jan. 9-11, 1973, Honolulu, HI, pp.424-426. 11. Fortmann, T. E., and S. Baron, ” Problems in Multi-Target Sonar Tracking, ” Proceeding of the 1978 IEEE Conference on Decision and Control, San Diego., CA, Jan. 1979, pp.1182-1188. 12. Chang, K. C., Chong, C.Y., and Bar-Shalom, Y., “ Joint Probabilistic Data Association in Distributed Sensor Networks, ” IEEE Trans. Automa. Contr., Vol. AC-31, pp. 889-897, Oct. 1986. 13. Bullock, T. E., Sangsuk-Iam, S., Pietsch, R., and Boudresu, E. J., ” Sensor Fusion Applied to System Performance Under Sensor Failures, ” Proceedings of SPIE. Vol. 931, Sensor Dusion, 1988. 14. Reid, D. B., “ An Algorithm for Tracking Multiple Targets, ” IEEE Trans. Automa. Contr., Vol. AC-24, pp. 843-854, Dec. 1979. 15. R. A. Singer, and K.W. Behnke, ” Real-Time Tracking Filter Evaluation and Selection for Tactical Applications, ” IEEE Trans. on Aerosp. and Electron. Sys., Vol. AES-7, No.1, pp. 100-110, March 1970. 16. B.D.O. Anderson , and J.B. Moore, ” Optimal Filtering, ” Pretice Hall Inc., 1979. 17. A.Farine, and

F. A. Studer,“ Radar Data Processing,” Research Studies Press Ltd., 1985. 18. Byron, Eddle.,“ Radar Principles, Technology, Applications,” Prentice-Hall Inc. 1993. 19. S. Haykin,“ Adaptive Filter Theory,” Prentice-Hall Inc.1991. 20. Hovanessian, S. A.,“ Radar System Design and Analysis,“ Artech House, Inc., 1984. 21. 余俊慶，“雷達適應性掃描速率追蹤系統之研究”，私立大葉大學碩士論文，2001. 22. 陳信達，“雷達多目標追蹤原理分析”，私立大葉大學碩士論文，2002. 23. 現代實用船舶雷達(上)，國立編譯館主編，徐氏基金會出版，1991. 24. 現代實用船舶雷達(下)，國立編譯館主編，徐氏基金會出版，1991. 25. 雷達觀測教材，江國地等編著，幼獅文化事業公司出版，1985.