The Research of Radar Multiple Target Maneuvering Estimate and Adaptive Systems

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ABSTRACT

ABSTRACT An improved algorithm for tracking multiple maneuve- ring targets using a new approach has been developed in this thesis. This algorithm is implemented with an adaptive filter consisting of a data association technique denoted 1-step conditional maximun likelihood together with a bank of Kalman filters as an adaptive maneuvering compensator. Via this approach, both data association and target maneuv- ering problems can be solved simultaneously. Moreover , in order to verify such a tracking system is really improved. Detailed simulations of the multi-target tracking using several tracking algorithms for many situations are developed. Computer simulation results indicate that this approach successfully tracks multiple targets and have better performance also.

Keywords : Maneuvering ; Data Association ; Measurement ; Innovation ; Covariance ; Prediction ; Adaptive Procedure

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REFERENCES

參考文獻: 1. 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. 2. 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. 3. Bar-Shalom, Y. , ” Tracking Methods in a Multi-Target Environment, ” IEEE Trans. Automa. Contr. , Vol., AC-23, pp. 618-626, Aug.1978. 4. Reid, D. B., “ An Algorithm for Tracking Multiple Targets, ” IEEE Trans. Automa. Contr., Vol. AC-24, pp. 843-854, Dec. 1979. 5. B.D.O. Anderson , and J.B. Moore, ” Optimal Filtering, ” Pretice Hall Inc., 1979. 6. 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. 7. Hovanessian, S. A., “ Radar System Design and Analysis, “ Artech House, Inc., 1984. 8. A.Farine, and F. A. Studer, “ Radar Data Processing, ” Research Studies Press Ltd., 1985. 9. 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. 10. Y. Bar-Shalom, and T.E. Formann, “ Tracking and Data Association, ” Artech House,1988. 11. E. Emre, and J. Seo, ” A Unifying Approach to Multi-Target Tracking , ” IEEE. Trans. Aerosp. Electron. Syst., Vol. AES-25, pp. 520-528, 1989. 12. 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. 13. S. Haykin, “ Adaptive Filter Theory, ” Prentice-Hall Inc.1991. 14. Byron, Eddle., “ Radar Principles, Technology, Applications, ” Prentice-Hall Inc. 1993. 15. R.L.Popp,K.R.Pattipati,Y.Bar-Shalom&M.Ysddanapudi ,"Parallelization of a Multiple Tracking Algorithm with Superlinear Speedups,"IEEE Trans. Aerosp. Electron. Syst. Vol AES-33 , pp.281-290,1997.3 16. S-T.Park&J.G.Lee, ” Design of a Practical Tracking Algorithm with Radar Measurements, ” IEEE Trans. Aerosp. Electron. Syst. Vol AES-34,pp.1337-1345,1998. 17. E.Mazor,J Dayan,A.Averbuch &Y.Bar-Shalom, ” Interacting Multiple Model Methods in Target Tracking: A Survey, ” IEEE Trans.Aerosp.Electron. Syst. Vol AES-34,pp.103-124,1998.