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Brockett's problem of classification of finite-dimensional estimation algebras for Nonlinear Filtering Systems

In his talk at the International Congress of Mathematicians in 1982, Brockett proposed classifying all finite-dimensional estimation algebras arising in nonlinear filters. Recently, Chen, Yau and Leung (1997) classified all finite-dimensional estimation algebras of maximal rank when the dimension of the state space is less than or equal to four. In this paper, without dimension assumption on the state space, we succeed in classifying all finite-dimensional estimation algebras of maximal rank with the state-space dimension being arbitrary.

Reference: Chen, J., Yau, S. S. -T. and Leung, C. W. , *Finite-dimensional filters with nonlinear drift VIII: classification of finite-dimensional estimation algebras of maximal rank with state-space dimension 4,* SIAM J. Control & Optim., 35(4)(1997), 1132–1141