NEW METHODS FOR ANALYSIS OF THE PERFORMANCE OF GUIDANCE AND CONTROL

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The investigation has continued in the use of information theory and in particular rate distortion theory to derive usable upper and lower bounds on the expected loss for the nonlinear filtering problem. A new design criterion has been derived which leads to effective designs of large systems when the entire state is not available for feedback control. Preliminary results have been obtained on the problem of absolute phase demodulation. New results which evaluate the information loss which results from use of the classical phase lock loop instead of the optimal demodulator, have been obtained and are being investigated.
New Methods For Analysis of the Performance of Guidance and Control Systems

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Research Summary

We continued to investigate the use of information theory and in particular rate distortion theory to derive useable upper and lower bounds on the expected loss for the nonlinear filtering problem. This has lead to an investigation of the constrained rate distortion function, where the variational problem which defines the rate distortion function is modified to include a realizability constraint, see (4).

In (6), we have derived a new design criterion which leads to effective designs of large systems when the entire state is not available for feedback control. This design minimizes the maximum time constant of the controlled system.

In the area of practical realization of nonlinear filters we have spent time in documenting the nonlinear filtering software we have developed for the Star, 7600,6600, the API208 in (2). We have preliminary results on the problem of absolute phase demodulation see (7), and have developed extensive software to evaluate various absolute phase estimation techniques on the basis of cycle slip performance. New results which evaluate the information loss which results from use of the classical phase lock loop instead of the optimal demodulator, have been obtained and are being investigated.

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RESEARCH FORMALY REPORTED

Papers Appearing

(1) R. S. Bucy, Filtering and Information, Information Sciences, 18, 1979, 179-187.


Papers Submitted


