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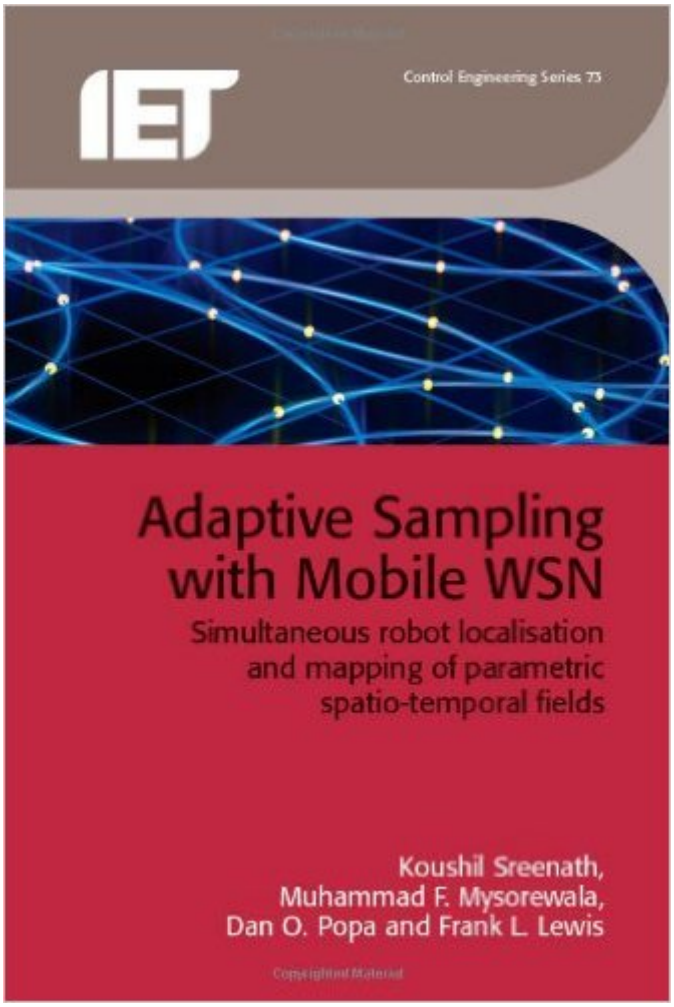
Adaptive Sampling With Mobile WSN: Simultaneous Robot Localisation And Mapping Of Paramagnetic Spatio-Temporal Fields (Iet Control Engineering Series)



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Synopsis

This book presents systematic methods for estimating environmental fields using multiple mobile sensors. Monitoring environmental fields is a complex task and is of great use in many areas, such as for building models of natural phenomenon, e.g. agriculture monitoring, such as monitoring soil temperature to manage frost, wind, water, disease, and pests. Ocean, river and lake monitoring of environmental phenomena, such as salinity in lakes, tracking water temperature, particulate densities and pollutants responsible for sustaining marine colonies, or coral cover of oceanic reefs. Meteorology monitoring, such as tracking of storms, gas plumes, and air quality; forest monitoring for tracking humidity in forests, and prediction and decision making during forest fire fighting, etc. Sampling is a broad methodology for gathering statistical information about a phenomenon. The capabilities and distributed nature of wireless sensor networks provide an attractive sampling approach for estimation of spatiotemporally distributed environmental fields. This is adaptive sampling, where the strategy for 'where to sample next' evolves temporally with past measurements. Thus the sensor network physically adapts with past measurements to enable sampling at locations that give maximal information about the field being estimated. This book presents adaptive sampling strategies with multiple, heterogeneous and mobile sensors. Sensors of this kind present several complexities, some of which like deadlocks and localisation issues are also addressed here.

Book Information

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