

## Signal Estimation and Closed Loop System Performance in Atrial Fibrillation Monitoring with Communication Channels

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**Abstract :** In this paper a unique issue rising from feedback control of Atrial Fibrillation monitoring system with embedded communication channels has been investigated. One of the important factors to measure the performance of the feedback control closed loop system is disturbance and noise attenuation factor. It is important that the feedback system can attenuate such disturbances on the atrial fibrillation heart rate signals. Communication channels depend on network traffic conditions and deliver different throughput, implying that the sampling intervals may change. Since signal estimation is updated on the arrival of new data, its dynamics actually change with the sampling interval. Consequently, interaction among sampling, signal estimation, and the controller will introduce new issues in remotely controlled Atrial Fibrillation system. This paper treats a remotely controlled atrial fibrillation system with one communication channel which connects between the heart rate and rhythm measurements to the remote controller. Typical and optimal signal estimation schemes is represented by a signal averaging filter with its time constant derived from the step size of the signal estimation algorithm.

**Keywords :** atrial fibrillation, communication channels, closed loop, estimation

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