DELAY ESTIMATION FOR NETWORKED CONTROL SYSTEMS

by

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To: *my parents, my country and mankind*

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Abstract

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It is known that transmission delays affect the dynamics of feedback control systems. Therefore, system designers should be aware of and compensate for the delays to prevent degradation. However, when dealing with real-time networked control systems measuring real-time transmission delay (e.g. delay between sensor and actuator) is not always possible. The alternative is to estimate the delay from available information, which can allow recovery of the desired dynamics.

Two estimation approaches are proposed in this study, static delay estimation and dynamic delay estimation. Static delay estimation is suitable for networks with consistent delays or varying delays with known patterns. Dynamic delay estimation is proposed for systems with unknown delay patterns, such as control systems over Ethernet.