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### Flow Controller Design and Performance Analysis for Self-Similar Network Traffic

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**Abstract:** Recent studies of high-resolution traffic measurement discovered the self-similarity in both LAN and WAN traffic. In this paper, we introduce a two-degree of freedom rate based flow controller, which includes a robust $H^{\infty}$ control block and an LMMSE based capacity predictor. The former part can guarantee the robust stability against time-varying time delay uncertainties and the latter improves the transient response by predicting the self-similar cross-traffic. Implementation issues are discussed and performance analysis is provided to validate our design. We also investigate the prediction and control in larger time scale which is more applicable for the real network environment