

# On the Construction and Analysis of a Delay Differential Model in Computer Systems

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A nonlinear delay differential model with multiple delays is proposed to analyze overload dynamics in computer systems. The model captures delayed feedback between processes and resources (e.g., CPU, I/O) as well as the effect of resource saturation. Sufficient conditions are derived for the local and global stability of equilibrium states, while numerical simulations illustrate the system's temporal evolution and its response to overload.