IEEE Transactions on Control Systems Technology. Volume:12. Number: 1. Pages: 205-210. January 2004

Modeling of thermal generating units for automatic generation control purposes

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Abstract— A simple discrete time model of a thermal unit has been formally developed for designing automatic generation control(AGC) controllers. This model has been developed using data obtained from specific tests and historical records. This model consists of a nonlinear block followed by a linear one. The nonlinear block consists of a dead band and a load change rate limiter, while the linear block consists of a second-order linear model and an offset. Although most of these elements have already been included in unit models for AGC presented in the literature, a certain mix up exists about which of them are necessary. This is clarified in this paper. It has been found that the unit response is mainly determined by the rate limiter, while the other model components are used for a better fitting to the real response. An identification procedure is proposed to estimate the values of the model’s parameters.

Index Terms— Automatic generation control (AGC), dead band, identification procedure, load change rate limiter, thermal unit model

Citation:
Egido, I.; Fernández-Bernal, F.; Rouco, L.; Porras, E.; Saiz-Chicharro, A.; "Modeling of thermal generating units for automatic generation control purposes", IEEE Transactions on Control Systems Technology, vol.12, no.1, pp.205-210. January, 2004.