DIPLOMA PROJECT

E.1277

COMPENSATION OF A CONTROL SYSTEM USING ROOT LOCUS METHOD WITH THE AID OF MAT LAB

By

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June 2001

SUMMARY

The purpose of the work is to put a control system under given specifications through root locus method by the used of MATLAB.

The relative stability and the transient performance of a closed loop control system are directly related to the location of the closed roots of the characteristic equation in the s-plane.

The root locus technique is a graphical method for sketching the locus of roots of a system in the s-plane as a parameter is varied. In fact the root locus method provide the engineer with a measure of the sensitivity of the roots of the system to a variation of the parameter being considered.

The root locus method provides graphical information, and therefore an approximate sketch can be used to obtain qualitative information concerning the stability and performance of the system. Furthermore the locus of roots of the characteristic equation of a multi-loop system may be investigated as readily as for a single-loop system.

The performance of a system can be described by requiring a certain peak time (Tp), maximum overshoot, and a settling time (Ts) for a step input. In this case when the gain variation does not result to the desired specifications, a lead compensator is needed to improve the transient response by decreasing the percentage overshoot and the settling time. On the other hand, when the performance is specified by the maximum steady-state error values, the lug compensator is needed to improve the specifications of the steady-state error.

The plot of the root locus and transient response can be done accurate by using MATLAB. Matlab also helps you to work faster with plots and there analysis.

An easy and simple way to check the specifications of a system especially when is complicated is the SIMULINK of MATLAB.

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