

<<控制理论MATLAB教程>>

图书基本信息

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内容概要

尾形克彦等编著的《控制理论MATLAB教程(英文版)》系统讲述基于MATLAB的控制系统分析和设计方法。

全书共7章。

第1章总体介绍了MATLAB的基本命令；第2章介绍了MATLAB分析和设计控制系统的预备知识；第3章讨论了如何应用MATLAB获得动态系统的瞬态响应；第4章和第5章分别讲解了如何运用MATLAB进行根轨迹和频域方法的分析和设计；第6章讨论了如何通过MATLAB处理状态空间极点配置和观测器设计问题；第7章提供了控制系统设计中最优参数组的选取方法及二次型最优控制器的求解方法。

《控制理论MATLAB教程(英文版)》的主要读者为自动化专业的本科生、控制科学与工程专业的研究生和从事控制领域工作的科研人员和工程师。

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章节摘录

版权页：插图： The phase margin of the compensated system is about 40° , which is the required value. The gain margin is about 11 dB, which is quite acceptable. The static velocity error constant is 5 sec^{-1} as required. The compensated system, therefore, satisfies both the steady-state and relative stability requirements. Note that the new gain crossover frequency is decreased from approximately 1 to 0.5 rad/sec. This means that the bandwidth of the system is reduced. To further show the effects of lag compensation, the log-magnitude-versus-phase plots of the gain-adjusted, but uncompensated, system $G_1(j\omega)$ and of the compensated system $G_c(j\omega)G(j\omega)$ are shown in Figure 5-61. The plot of $G_1(j\omega)$ clearly shows that the gain-adjusted, but uncompensated, system is unstable. The addition of the lag compensator stabilizes the system. The plot of $G_c(j\omega)G(j\omega)$ is tangent to the $M = 3 \text{ dB}$ locus. Thus, the resonant peak value is 3 dB, or 1.4, and this peak occurs at $\omega = 0.5 \text{ rad/sec}$. Compensators designed by different methods or by different designers (even using the same approach) may look sufficiently different. Any of the well-designed systems, however, will give similar transient and steady-state performance. The best among many alternatives may be chosen from the economic consideration that the time constants of the lag compensator should not be too large. Finally, we shall examine the unit-step response and unit-ramp response of the compensated system and the original, uncompensated system without gain adjustment.

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编辑推荐

《控制理论MATLAB教程(英文版)》的主要目的是讲述如何使用MATLAB命令来分析和解决控制问题，但书中也较为全面地介绍了控制理论的基本概念和理论，并以MATLAB命令对例题进行了全面的分析和求解，所以读者会感到书中的内容特别具有针对性。因此，通过对《控制理论MATLAB教程(英文版)》的学习不仅能够掌握利用MATLAB进行控制系统仿真的技能，而且能够加深对控制理论中基本概念的理解，培养控制系统分析和设计的能力。

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