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多速率数字飞行控制系统

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MULTI-RATE DIGITAL FLIGHT CONTROL SYSTEMS

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摘要 本文针对数字飞行控制系统的多速率特点,分析了等效变换的方法及变换成单速率系统的过程,并由此讨论了多速率系统的性能及其设计方法。

关键词：

Abstract： Considering the multi-rate sampling feature of digital flight control systems, the approach of equivalent transformation and its transformation into an equivalent single-rate system are analyzed.The method of decomposition of sampling signal in frequency domain may be utilized in this equivalent transformation. To simplify the implementation and timing on computer, the ratio of sampling rate n is often considered as an integer. Thus, the equivalent single-rate system may be represented by Z transfer function with several parallel paths. If the integer n is such a small number as 2, 4, the computation is not very complicated.The behavior of multi-rate system is discussed. It may be illustrated by a simple system. As a high sampling rate has been introduced to one part of the system, the open-loop poles and its steady-state gain of the resulted system are not varied, only a zero is added in the real axis of the Z-plane. It implies that the margin of stability is increased, the overshoot of step response and D/A output ripple may be decreased. The unequal sampling rates can be adopted to improve system performance.Finally, the approaches to design multi-rate digital flight control system are described in brief.

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