时滞系统课题介绍

时滞现象[1]，又称为时延现象或滞后现象，泛指行为的执行时刻与显效时刻不一致的情况对于具有实时特性的工程实际系统，时滞现象会明显改变系统动态的演变，对系统性能和稳定性造成不可避免的冲击。将此类具有时滞特性的系统并称为时滞系统。时滞系统常常使用泛函微分方程，又称微分差分方程或时滞微分方程，刻画系统动态.Krasovskii 在文献[2]中首次提出针对时滞系统的李雅普诺夫函数应当考虑时滞状态。引入时滞状态到李雅普诺夫函数中，得到 L-K 泛函。

L-K 泛函方法的基本研究路线是确定一个表示系统能量的正定泛函，使其沿系统轨迹相对时间的导数负定，从而保证系统整体能量呈持续衰减的状态。研究过程中主要难点是设计 L-K 泛函，确保泛函的正定性和泛函导数负定性，所得条件共同组成了时滞系统的稳定判据。通过文献调查法，按照 L-K 泛函的提出时间，结合其发展情况，梳理了各种 L-K 泛函，完全 L-K 泛函[3]，时滞无关 L-K 泛函[4] [5]，增广 L-K 泛函[6] [7]，时滞分割 L-K 泛函[8]，多重积分 L-K 泛函[9]，时滞乘积 L-K 泛函[10]

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