上海交通大学自动化系
Department of Automation
Shanghai Jiao Tong University

系统控制与信息处理教育部重点实验室
Key Laboratory of System Control and Information Processing, Ministry of Education

学术报告会

时　间：2021年5月12日(周三) 14:00-16:00

地　点：电院群楼2-410会议室

邀请人：何建平

A Distributed Estimator Design via Decomposing Steady-State Kalman Filter

莫一林

清华大学

Abstract:

The past decades have witnessed remarkable advancement of sensor networks. As one of its fundamental tasks, distributed estimation, which provides better resiliency, flexibility and reliability comparing with its centralized counterpart, has been widely studied in various applications including robot formation control, environment monitoring, spacecraft navigation. However, most of the distributed algorithms proposed in the literature require specific network topology, cannot tolerate imperfection in the communication (such as packet drops or delays) and provide no clear stability or performance guarantees. In this talk, we propose a framework for distributed estimator on a Linear Time-Invariant (LTI) Gaussian system. By a lossless decomposition of optimal steady-state Kalman filter, we show that the problem of distributed estimation can be reformulated as synchronization of homogeneous linear systems. We further show that any linear system synchronization algorithm that is consistent and converges exponentially can be adapted to solve the distributed estimation problem. Numerical examples are provided in the end to illustrate the efficiency of the proposed algorithm.

Biography:

莫一林，现任清华大学自动系副教授。他于 2007 年在清华大学自动化系获得学士学位，2012 年于美国卡内基梅隆大学电子与计算机工程系获得博士学位。加入清华大学之前，他曾于卡内基梅隆大学，加州理工学院进行博士后研究。2015 年他加入了新加坡南洋理工大学电子与电机工程学院，任助理教授，2018 年返回清华大学自动化系任职。目前担任控制领域期刊 Automatica 的 Associate Editor。他的主要研究方向包括控制系统安全与网络化控制系统，及其在智能电网、机器人与无人驾驶领域的应用。