How can we affordably build trustworthy networked, information-based systems? The talk begins with an interpretation of this question in the context of autonomous systems and more-electric air vehicles. Partly motivated by the difficulty and cost of establishing trust in these applications, I describe a shift from the traditional "design+verify" approach to "specify+synthesize." I then discuss our recent advances in automated, correct-by-construction synthesis of embedded control protocols. I present two results on receding horizon temporal logic planning and distributed synthesis. These results combine ideas from control theory with those from computer science, and exploit underlying system-theoretic interpretations to alleviate the resulting computational complexity. I conclude with an outlook on future research opportunities in autonomy, advanced vehicular systems, and energy networks.

Biography

Ufuk Topcu is a postdoctoral scholar of Control and Dynamical Systems at the California Institute of Technology. He received his Ph.D. in 2008 from the University of California, Berkeley. His research is on the analysis, design, and verification of networked, information-based systems. Current projects are in autonomy, advanced air vehicle architectures, and energy networks. He has served on several technical committees and conference program committees of AIAA, IEEE, and IFAC. In 2012, he received an Air Force Young Investigator Research Program Award.

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