



Relazione attività scientifiche 2019 Laboratorio Congiunto COOPS

Tutte le attività svolte nell'ambito del progetto a partire da ottobre 2014 sono descritte nella pagina web

<http://www.sct.ieiit.cnr.it/COOPS/index.html>

Attività principali svolte nel 2018

- Research Visit and Invited Talks at Osaka University

March 13-17, 2018, Elisa Capello, Elisabetta Punta and Yasumasa Fujisaki at Osaka University, Osaka, Japan.

March 15, 2018, invited talk by Elisabetta Punta, "*Sliding Mode Control Strategies for Spacecraft Rendezvous Maneuvers.*"

March 15, 2018, invited talk by Elisa Capello, "*"Flyable" guidance and control algorithms for Rendezvous Maneuver: APF and Obstacle Avoidance.*"

- CREST/COOPS Workshop 2018 at SICE Annual Conference, Nara, Japan

September 11, 2018, Fabrizio Dabbene and Yasumasa Fujisaki (Organizers): Conference Workshop "*Cooperative Control for Energy Management Systems*" held at the 2018 SICE conference. More than 30 attendees.

- Research Visit and Invited Talks at Osaka University

September 15-20, 2018, Elisa Capello, Fabrizio Dabbene, Giorgio Guglieri, Elisabetta Punta, Chiara Ravazzi and Yasumasa Fujisaki at Osaka University, Osaka, Japan.

September 18, 2018, invited talk by Chiara Ravazzi, "*Influence estimation in Friedkin and Johnsen's opinion dynamics over sparse social networks.*"

September 15, 2018, invited talk by Giorgio Guglieri, "*UAV/RPAS Navigation Systems: Applications for Power & Electrical Lines Monitoring .*"



- Final meeting COOPS Project

September 19, 2018, Final meeting of the project held at Osaka University, Osaka, Japan.
Participants: Elisa Capello, Fabrizio Dabbene, Giorgio Guglieri, Elisabetta Punta, Chiara Ravazzi and Yasumasa Fujisaki.

Attività principali svolte nel 2019

Benché il progetto finisse formalmente il 31 Dicembre 2018, le attività di collaborazione e di visita sono continuate e continuano nel 2019

- Participation to the 2019 JST-NSF-RCN Workshop on Distributed Energy Management Systems

June 19-22 2019: Elisa Capello, Elisabetta Punta, participation to the "2019 JST-NSF-RCN Workshop on Distributed Energy Management Systems."

Presentation of the poster: "Wind Turbines Sliding Mode Control and Wind Farms Optimization Issues. Fatigue and Power trade-off for wind farm applications". Authors: E. Capello, T. Wada, E. Punta and Y. Fujisaki

- Research Visit at Osaka University

June 22 – July 02 2019: Osaka University. Research activity and finalization of publications. Conclusion of wind farm activity, and submission of the paper "Optimization of Fatigue Loads and Sliding Mode Technique for Wind Farm Scenarios" to the journal IET Control Theory and Applications.

Preparation of two articles for the 21st IFAC World Congress 2020.

June 27 2019: invited talk by Elisa Capello "Flight Control System Design and Identification for a Multirotor UAV"

June 27 2019: invited talk by Elisabetta Punta "Sliding Mode Control: a Survey of Strategies and Applications"

Sono inoltre previste due collaborazioni future: (1) approfondimento teorico di algoritmi Sliding Mode e (2) implementazione ed estensione di un controllore ottimo di tipo Linear Quadratic Regulator per applicazioni aeronautiche



Elenco delle pubblicazioni scientifiche collegate al progetto

Articoli a rivista

1. M. Chamanbaz, F. Dabbene, C.M. Lagoa "Probabilistically Robust AC Optimal Power Flow" IEEE Transactions on Control of Network Systems, in press, 2019, doi: 10.1109/TCNS.2019.2921300
2. M. Mammarella, M. Lorenzen, E. Capello, H. Park, F. Dabbene, F. Allgöwer, M. Romano, "An Offline-Sampling SMPC Framework with Application to Automated Space Maneuvers," IEEE Transactions on Control Systems Technology, 2018, doi:10.1109/TCST.2018.2879938
3. M. Mammarella, E. Capello, F. Dabbene, G. Guglieri "Sample-based SMPC for tracking control of fixed-wing UAV," IEEE Control Systems Letters, 2018, doi:10.1109/LCSYS.2018.2845546
4. E Capello, F. Dabbene, G Guglieri, E Punta "Flyable Guidance and Control Algorithms for Orbital Rendezvous Maneuver," SICE Journal of Control, Measurement, and System Integration vol. 11(1), pp. 14-24, 2018 doi: https: 10.9746/jcmsi.11.14
5. C. Ravazzi, R. Tempo, and F. Dabbene "Learning influence structure in sparse social networks," IEEE Transactions on Control Network Systems, vol. 5(4), pp. 1976-1986, 2018 doi: 10.1109/TCNS.2017.2781367
6. M. Lorenzen, F. Dabbene, R. Tempo, and F. Allgöwer "Stochastic MPC with offline uncertainty sampling," Automatica, vol. 81, pp. 176-183, 2017, doi:10.1016/j.automatica.2017.03.031
7. M. Chamanbaz, F. Dabbene, D. Peaucelle, C. Pittet, and R. Tempo "Randomized and Robust Methods for Uncertain Systems using R-ROMULOC, with Applications to DEMETER Satellite Benchmark," Journal Aerospace Lab, in press, 2017, doi:10.12762/2017.AcL13-04
8. E. Capello, E. Punta, F. Dabbene, G. Guglieri, and R. Tempo "Sliding Mode Control Strategies for Rendezvous and Docking Maneuvers," AIAA Journal of Guidance, Control, and Dynamics, vol. 40, pp. 1481-1487, 2017, doi:10.2514/1.G001882
9. W. Zhao, H.-Fu Chen, R. Tempo, and F. Dabbene, "Recursive nonparametric identification of nonlinear systems with adaptive binary sensors," IEEE Transactions on Automatic Control, vol. 62, pp. 3959-3971, 2017, doi:10.1109/TAC.2017.2651640
10. M. Lorenzen, F. Dabbene, R. Tempo, and F. Allgöwer "Constraint tightening and stability in stochastic model predictive control," IEEE Transactions on Automatic Control, vol. 62, pp. 3165-3177, 2017, doi:10.1109/TAC.2016.2625048



11. S. Formentin, F. Dabbene, R. Tempo, L. Zaccarian, and S.M. Savaresi "Robust linear static anti-windup with probabilistic certificates," IEEE Transactions on Automatic Control, vol. 62, pp. 1575-1589, 2017, doi:10.1109/TAC.2016.2586606
12. F. Dabbene, D. Henrion, and C.M. Lagoa "Simple approximations of semialgebraic sets and their applications to control," Automatica, vol. 78, pp. 110-118, 2017, doi:10.1016/j.automata.2016.11.021
13. M. Chamanbaz, F. Dabbene, R. Tempo, V. Venkataramanan and Q.-G. Wang "Sequential Randomized Algorithms for Convex Optimization in the Presence of Uncertainty," IEEE Transactions on Automatic Control, vol. 61, pp. 2565-2571, 2016 doi: 10.1109/TAC.2015.2494875
14. P. Frasca, H. Ishii, C. Ravazzi, R. Tempo, "Distributed randomized algorithms for opinion formation, centrality computation and power systems estimation: A tutorial overview" European journal of control 24, 2-13, 2015, doi 10.1016/j.ejcon.2015.04.002
15. C. Ravazzi, P. Frasca, R. Tempo and H. Ishii, "Ergodic Randomized Algorithms and Dynamics Over Networks," in IEEE Transactions on Control of Network Systems, vol. 2, no. 1, pp. 78-87, March 2015 doi: 10.1109/TCNS.2014.2367571

Capitoli di libro/encyclopedia

1. M. Chamanbaz, F. Dabbene, C.M. Lagoa "Algorithms for Optimal AC Power Flow in the Presence of Renewable Sources" Wiley Encyclopedia of Electrical and Electronics Engineering, 2019
2. D. Arzelier, F. Dabbene, S. Formentin, D. Peaucelle, L. Zaccarian "Robust static output feedback design with deterministic and probabilistic certificates" Uncertainty in Complex Networked Systems, 121-148, T. Basar Editor, 2019

Articoli a congresso

1. I. Masubuchi, T. Wada, Y. Fujisaki, F. Dabbene "A New Distributed Constrained Multi-Agent Optimization Protocol with Convergence Proof via Exactness of Penalized Objective Function" 2019 12th Asian Control Conference (ASCC), 19-24, 2019
2. C. Ravazzi, S. Hojjatinia, C.M. Lagoa, F. Dabbene "Randomized opinion dynamics over networks: influence estimation from partial observations" 2018 IEEE Conference on Decision and Control (CDC), 2452-2457, 2018
3. I. Masubuchi, T. Wada, Y. Fujisaki, and F. Dabbene "Improvement of distributed multi-agent optimization protocol based on exact penalty method", SICE Annual Conference 2017, pp. 262-265, 2018



4. I. Masubuchi, T. Wada, Y. Fujisaki, and F. Dabbene "Distributed multi-agent optimization for Pareto optimal problem over unbalanced networks via exact penalty methods with equality and inequality constraints", 23rd International Symposium on Mathematical Theory of Networks and Systems, pp. 447-452, 2018
5. E Capello, T Wada, E Punta, Y Fujisaki, "Minimax Optimization of Fatigue Loads in a Wind Farm and its Realization Via Sliding Mode Controller of Wind Turbines" 2018 IEEE Conference on Control Technology and Applications (CCTA), 430-435, 2018
6. E Capello, T Wada, E Punta, Y Fujisaki, "Wind Farm Sliding Mode Control and Energy Optimization with Fatigue Constraints" SICE International Symposium on Control Systems, 2018
7. C Ravazzi, R Tempo, F Dabbene, "Influence estimation in sparse social networks" 2017 IEEE 56th Annual Conference on Decision and Control (CDC) December 12-15, 2017, Melbourne, Australia
8. M Mammarella, E Capello, M Lorenzen, F Dabbene, F Allgower "A general sampling-based SMPC approach to spacecraft proximity operations" 2017 IEEE 56th Annual Conference on Decision and Control (CDC), 4521-4526, 2017

Premi conseguiti

L'articolo

I Masubuchi, T Wada, Y Fujisaki, F Dabbene "A New Distributed Constrained Multi-Agent Optimization Protocol with Convergence Proof via Exactness of Penalized Objective Function" 2019 12th Asian Control Conference (ASCC), 19-24, 2019

è stato premiato con il ACCS2019 Best Paper Award