

Spoštovani člani DAS-a, vabljeni na predavanje prof. Marca Ariole z naslovom Uvod v magnetno vodenje tokamak plazme, ki bo v petek 26.2. ob 13h v Veliki predavalnici Instituta Jožef Stefan. Predavanje bo v angleškem jeziku. Predavanje organizira Samo Gerke, Odsek za sisteme in vodenje, Institut Jožef Stefan.

Spodaj je povzetek predavanja in biografijo avtorja v angleščini in slovenščini.

Lep pozdrav, Božidar Bratina, tajnik DAS-a

Title - Magnetic control of a tokamak plasma: an introduction

Abstract - In this lecture, the problems of position, current, and shape control of plasma in tokamak-type (toroidal) devices will be introduced. Modelling issues will be briefly discussed, and then the control problem will be described, beginning with the control of current and position and progressing to the more challenging shape control. The solutions proposed vary from simple PIDs to more sophisticated MIMO controllers. Eventually, the controller implemented at JET, the eXtreme Shape Controller, will be presented, along with a system, called Current Limit Avoidance, which has been implemented to address the problem of current saturations.

Biosketch - Marco Ariola was born in Naples, Italy in 1971. He graduated in Electronic Engineering with honors in 1995 at the University of Naples Federico II. He worked for the Italian Aerospace Research Centre from 1995 to 1996, as a researcher in the group of Flight Mechanics and Control. Then he received a PhD in Electrical Engineering and Computer Science in 2000 from the University of Naples Federico II. In 1997 and 1998 he was a visiting researcher at the Ecole Polytechnique Federale de Lausanne, Switzerland, and for several periods between 1998 and 2000 Visiting Researcher at the Department of Electrical and Computer Engineering at the University of New Mexico, USA. He has spent long periods at research laboratories for controlled thermonuclear fusion, and particularly in Japan, Naka at the Japan Atomic Energy Agency, and in England at the JET (Joint European Torus), where he was responsible for several experiments. Presently he is Full Professor of Automatic Control at the University of Naples Parthenope, where he is the Coordinator of the PhD program in "Information Engineering". His research is directed both to methodology issues, such as the study of stability and stabilization of uncertain systems, and to relevant applications, such as control of the plasma in machines for nuclear fusion and planning and tracking of trajectories for UAVs. His research activity is documented by more than 150 international publications, appeared as articles in international journals or conference proceedings. He is co-author of two monographs for Springer-Verlag ("Magnetic Control of Tokamak Plasmas", and "Finite-Time Stability and Control") and of the chapter on "Input-Output Stability" for the "Wiley Encyclopedia of Electrical and Electronics Engineering".

Naslov - Magnetno vodenje tokamak plazme: Uvod

Povzetek - V tem predavanju bodo predstavljeni problemi vodenja pozicije, toka in oblike preseka plazme v toroidnih tokamak reaktorjih. Okvirno bo podan pristop modeliranja. Nato bo opisan problem vodenja, zaenkrat z regulacijo toka in pozicije plazme, do bolj zahtevne regulacije oblike preseka plazme. Predlagane rešitve segajo od preprostih PID regulatorjev do bolj zapletenih multivariabilnih regulatorjev. Predstavljen bo regulator, ki je izveden v največjem delujočem tokamaku JET (Joint European Torus, Culham, VB), imenovan "eXtreme Shape Controller", z dodatnim sistemom "Current Limit Avoidance", ki je bil izveden za reševanje problema zasičenja tokov v magnetnih navitjih.

Biografija - Marco Ariola je bil rojen v Neaplju leta 1971. Leta 1995 je diplomiral iz elektrotehnike na neapeljski univerzi Federico II. Od 1995 do 1996 je bil zaposlen kot raziskovalec italijanskega letalskega raziskovalnega centra. Leta 2000 je prejel doktorat elektrotehnikih in računalniških znanosti na neapeljski univerzi Federico II. V letih 1997-2000 je bil gostujoči raziskovalec na švicarski Ecole Polytechnique Federale de Lausanne in ameriški University of New Mexico. Daljša obdobja je sodeloval v raziskovalnih laboratorijih za nadzorovano termonuklearno fuzijo, posebej pri Japonski agenciji za atomsko energijo v Naki in pri JET v Angliji. Trenutno je redni profesor avtomatskega vodenja na neapeljski univerzi Parthenope, kjer je koordinator programa doktorskega študija informacijskega inženirstva. Njegovo raziskovalno delo je usmerjeno tako v metodološke smeri, kot na primer raziskave stabilnosti in stabilizacije negotovih sistemov, kot tudi v povezane aplikacije s področij vodenja plazme v napravah za jedrsko fuzijo ter načrtovanja in sledenja trajektorij avtonomnih zračnih plovil. Njegova raziskovalna aktivnost je dokumentirana v več kot 150 mednarodnih objavah v obliki člankov v mednarodnih znanstvenih revijah in konferenčnih zbornikih. Je soavtor dveh monografij pri založbi Springer ("Magnetic Control of Tokamak Plasmas" in "Finite-Time Stability and Control") ter poglavja "Input-Output Stability" v "Wiley Encyclopedia of Electrical and Electronics Engineering".