Andrea Tantucci

Curriculum Vitae

Education

2015–2018 **Bachelor in Computer and Automatic Engineering**, *The University of Rome*, Sapienza, *110/110 summa cum laude*.

I have worked with two other collegues to a project regarding the topic of Neural Network, in particular we have tackled the problem of image classification. We have used the Python Framework to build a Deep Convolutional Neural Network, then we have proceeded through its training on a labeled dataset which have been modified using specific metodologies so as to increase the effectiveness of the training, such as data augmentation.

2018-2020 **Master Degree in Control Engineering**, *The University of Rome*, Sapienza.

- I have worked with another collegue in a project regarding the Optimal Control Problem of an Active Suspension System using the LQR approach. We have analyzed this problem with and without the presence of an electro–hydraulic actuator which has a nonlinear dynamics.
- Ihave worked with two other collegues in a project concerning gait generation for a humanoid robot with five degrees of freedom. The aim was to apply and compare two different approaches: the first one was characterized by the use of a feedback linearization control law, while the second one was the tracking of a center of mass trajectory obtained through differential kinematics.
- I have worked with three other collegues in the analysis and application of a mechanical KERS system on a Formula 1 vehicle. The aim was to develop a PID controller in order to regulate the flow of energy between the flywheel and the vehicle by acting on the difference of the angualar velocities of the flywheel and the wheels. Then we have performed other simulations changing the parameters of the controller and also changing the cost function from a linear to a nonlinear one.

Bachelor Thesis

Title *Modellization Of Power Systems And Syntesis Of A Frequency Controller*

Advisor Professor Alessandro Di Giorgio

Description This thesis presents the structure of a generic power system and the possible problems which characterized it. In particular i have tackled the problem of frequency disturbances and how to build a controller which allows the network to recover in minimum time and with a good behaviour in the transient.

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Master Thesis

Title *Active Vibration Compensation for Attitude Control of a Flexible Satellite*

Advisors Prof. Francesco Delli Priscoli; Prof. Paolo Gasbarri

Co-Advisors Doct. Alessandro Giuseppi; Mr. Paolo Iannelli

Description I developed the thesis in collaboration with the research group of Prof. Paolo Gasbarri of Aerospace Engineering. The work is related to attitude and vibration control of a satellite with three flexible appendages, two solar panels and a truss. The dynamic models which i have considered are two: a simplified linear one and a more complex nonlinear model. Both of them are characterized by a rigid body dynamics and an elastic dynamics. In the linear model the attitude is defined by one angle which represents the rotation of the satellite around the z-axis. In the nonlinear one the attitude is defined by quaternions. The elastic dynamics is the same for both models and is characterized by the presence of 14 natural modes. Regarding attitude control i have used an MPC which, through the choice of weights on input and output variables, allows to perform a flexible tuning. I have analized the effects of this controller on the elastic dynamics, on which the MPC acts in a passive way, and i have noticed that the oscillations of the structure during the maneuver are not damped in an optimal way. Then i have used an active vibration control methodology which is called Direct Velocity Feedback in order to solve this issue, which turned out to be very effective. A possible future work on this thesis is the implementation of an EMPC (Explicit MPC) controller which uses less resources with respect to the original MPC.

Computer skills

Basic Java, C, C++, Python, Assembly

Intermediate Matlab & Simulink, LaTeX

Languages

English Intermediate *Cambridge FCE*

Attitudes

I am well disposed to work in a team, i am a precise person with a strong attitude to problem solving. I like to learn new things and i am open to new opportunities.

Interests

My research interests are related to the aerospace field, but i am interested to work in other specific fields where a control engineer is required. Regarding my personal interests i love sport and cinema. I also like listening to music and i am very keen to travel.

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