ALL. B

SCHEDA PER LA RELAZIONE ANNUALE DEL DOTTORANDO CICLO XXXII, Anno 2016-2017

- Nome e Cognome: Luis Miguel Castellanos Molina
- Dottorato in **INGEGNERIA MECCANICA**
- Ciclo XXII Anno di Corso 2016-2017
- Dipartimento di afferenza: MECCANICA
- Coordinatore: **Prof. Luigi GARIBALDI**
- Tutore: Prof. Andrea TONOLI
- Area Culturale di Interesse (in Italiano e Inglese)
  Embedded Constrained Optimal Control for Active Magnetic Bearings

- Breve descrizione dell'argomento della tesi o dell'Area Culturale di Interesse (massimo 20 righe, in Italiano e Inglese)

  Active Magnetic Bearings (AMB) are mechatronic systems where there is no contact between bearing and rotor, and this permits operation with no lubrication and no mechanical wear. Turbomolecular vacuum pumps, flywheel energy storage systems and other high-speed rotating machinery are the most significant industrial applications. The number of industrial AMB applications is growing steadily.

  Motivation: (i) Input and output constraints, (ii) stringent control requirements and (iii) many variables involved (multivariable system) in AMBs make interesting to apply constrained optimal control strategies.

  Implementation challenges: (i) AMBs have inherent nonlinear and unstable open loop nature, and very fast dynamics. (ii) The main limitation of constrained optimal control in fast dynamic systems is the computational effort required to solve an optimization problem online. Still a lot of research is going on to address real-time requirements…

  Main objective: Evaluate different approaches for embedded constrained optimal control on Active Magnetic Bearings.

- Attività di formazione svolta nell'anno (corsi, seminari, etc.); per ogni attività specificare natura, durata e sede

  POLITO:
  Course 01QTHIU. Name: Techniques of Robust Control. Credits: 6 CFU. Date: 04/07/2017
  Course 01LXBRW: Name: Life Cycle Assessment. Credits: 5 CFU. Date: 03/07/2017
  Course 01QRVIU: Name: Model predictive control: theory and practice, not finished
  Seminar: Matlab for Academia, 30/03/2017
  Seminar: Simulink for power electronics in automotive application. Date: 30/03/2017

  INRIM:
  Course 01QSXRU: Name: The measurement of electrical impedance, Credits: 2 CFU, 29/03/2017.

  MATHWORKS:
  Seminar: Progettare ed implementare algoritmi DSP su sistemi embedded con MATLAB e Simulink, 22/02/2017.

  CRF:
  Seminar: dSPACE RoadShow 2016, CRF Orbassano Center, 28/09/2016

- Eventuale partecipazione del Dottorando ad ulteriori attività di ricerca nell'anno (progetti e convenzioni di ricerca)

- LIM Project: Height adjustment suspension system. Work conducted: Programming and Commissioning for fatigue test of prototype.
- LIM Project: Test Belt System. Work conducted: Commissioning of CanOPEN communication.

Torino, 29/09/2017

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Firma del Tutore

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Firma del Dottorando

Il Coordinatore
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