Identification and Control for High-Tech Motion Systems

Identification in high-tech

*Man on the moon:* Automated identification and control for complex multivariable motion systems

From Experimental Data ... 8 outputs, ≥ 6 inputs, 10,000 freq. points

... to a Parametric Model ...
50 modes, minimal McMillan degree

Minimizing for control
Robust, high-performance controller

Modelling for robust control
Control-relevant model set:
Tight bound on worst-case performance

Experimental validation on an industrial motion system

Inferential: predicting performance
Performance variable \( z \neq \) measured variable \( y \)

Accurate models for \( P_y \) and \( P_z \) used in controller synthesis

Inferential control in motion systems:

Next-generation mechatronic design

Vision: Lightweight motion systems for very fast and ultra accurate positioning

Potential problem: Structural deformations

Our approach: Modelling and control of structural modes by exploiting additional actuators and sensors

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