Diploma Thesis Assignment

Student: **Dhanush Aswin Ashok Kumar**

Study Programme: N0714A270004 Mechatronics

Title: Analysis of the Dynamic Behaviour of the Hexapod Using the Simulation

                     Analýza dynamického chování hexapodu pomocí simulace

The thesis language: English

Description:

1. Description of the kinematic structure of the hexapod.
2. Creating of the hexapod simulation model using the Multi-body library in MATLAB-Simulink allowing the parameterization in dependence on the size of the hexapod – dimension of the upper and lower base, pod's length.
3. Design of the simulation model of the pod, which consists of the DC motor and ball screw and implementation of the actuator's models into the multibody model of hexapod.
4. Design of the closed loop position control of the pod. Evaluation of the control quality for different desired trajectories.
5. Description of the control system of the Acrome platform.
6. Design of the control of the platform using the desired values generated in MATLAB-Simulink.
7. Verification of the control of the hexapod on the Acrome platform.
8. Evaluation of the achieved results and conclusions.

References:

Noskievič, P.: Modelling and Simulation of Mechatronic Systems using MATLAB-Simulink. VŠB-TU Ostrava, 2013, 85 pp. ISBN 978-80-248-3250-3.
M. Davis, T., L. Schmitz: System Dynamics for Mechanical Engineers. Springer, 2015. ISBN 978-1-4614-9293-1.
Labontiu, N.: System Dynamics for Engineering Students. Academic Press, Elsevier. ISBN 978-0-12-804559-6.
El-Sharkawi, M.A. Fundamentals of Electric Drives. Cengage 2019, 2020. ISBN: 978-1305-97096-0.
Tsai, Lung-Wen. Robot analysis: the mechanics of serial and parallel manipulators. New York: Wiley, c1999. ISBN 0-471-32593-7.
SMITH, David M. Engineering computation with MATLAB. 3rd ed., international ed. Boston: Pearson, c2013. Always learning. ISBN 978-0-273-76913-2.

Extent and terms of a thesis are specified in directions for its elaboration that are opened to the public on the web sites of the faculty.

Supervisor: **prof. Ing. Petr Noskievič, CSc.**

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