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PARAMETERS ESTIMATION FOR 2DOF MANIPULATOR
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Введение. In modern manufacturing industry, robot manipulator systems are widely adopted in many aspects such as assembling, welding, painting, etc. In order to ensure the stability of the control performance, that highly depends on the accuracy of the system dynamic model. To establish the accurate dynamic model, the knowledge of system dynamic parameters is required.

Основная часть. In this work we use a system parameterization to represent the dynamic equation of the 2 DOF robotic manipulator, this parameterization turns the systems into a form suitable to abpply DREM on. DREM (Dynamic Regressor Extension And Mixing) allows us to exploit the parameterization, to estiamte the parameters of our system (the masses and lenghts of the links), and it ensures that the estimated values converge to thier real values.

We also design an adaptive controller for the 2 DOF robotic manipulator to track a desired input, that incorporates parameters estiamtion.

The schemes for the controller and the parameters estimation based on DREM are modeled in MATLAB Simulink. The results shows the ability of the controller to track the input, and the convergance of the estimated vales to the real values of the parameters.

Выводы. The estimation of inertial parameters of a robotic system is crucial for better trajectory tracking performance, specially when model-based controllers are used for carrying out precise tasks. The parametrization and the control methods shouldbe applicable to robots with higher DOF, a further investigation is due, but the simulation of the methods on a 2 DOF shows thier ability to track a desired input.

Список использованных источников:

1   Ortega, R., Gromov, V., Nuño, E., Pyrkin, A., & Romero, J. G. (2019). Parameter estimation of nonlinearly parameterized regressions without overparameterization nor persistent excitation: Application to system identification and adaptive control. *arXiv preprint arXiv:1910.08016*.

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