Panupun Mungkala 2012: Path Planning using Gauss Pseudospectral Method and Neighboring Optimal Feedback Control for Industrial Robot. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Peerayot Sanposh, D.Sc. 96 pages.

This thesis proposes a path planning method for industrial robots. The objective is to find the path planning to move a robotic arm between two points, with two types of objective functions: time and energy minimization, under control input and control input rate constraints.

This thesis uses Gauss Pseudospectral Method (GPM) for solving nonlinear optimal control problems. This method is a direct method, and discretizes a continuous optimal control problem into a nonlinear program (NLP). Furthermore, it is based on global polynomial approximations to dynamic equations at a set of Legendre-Gauss collocation points (LG points). The effectiveness of this approach has been demonstrated by simulating path planning optimization of an industrial robot and applied to Neighboring Optimal Feedback Control.

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