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Mae, Masahiro ; van Haren, Max; Ohnishi, Wataru ; Oomen, T.A.E.; Fujimoto, Hiroshi

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Feedforward of Sampled-Data System for High-Precision Motion Control using Basis Functions with ZOH Differentiator

Masahiro Mae¹, Max van Haren², Wataru Ohnishi¹, Tom Oomen^{2,3}, and Hiroshi Fujimoto¹

Abstract—Feedforward control has an important role in high-precision mechatronic systems. The aim of this research is to design a discrete-time feedforward controller to improve on-sample and intersample errors. The developed approach is parameterized using a linear combination of parameters and basis functions, which results in a parameterization that has intuitive physical meaning. The basis functions are designed with a differentiator that considers the sampled-data and zero-order-hold aspects. The performance improvement is demonstrated by comparing the developed approach with a conventional basis function design for a motion system.

¹The University of Tokyo, Japan. (mmae@ieee.org) ²Eindhoven University of Technology, The Netherlands. ³Delft University of Technology, The Netherlands.