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Explicit Solution of Parameter Estimate using Multiparametric Programming for Boost Converter

Abstract

This work proposes an approach to estimate the parameters of capacitance and inductance in a boost converter using an explicit solution. A multiparametric programming (MPP) algorithm is fundamental to the suggested methodology, which aims to develop parameters as explicit functions of measurements. In this method, the generalised mathematical model of the boost converter is discretised into an algebraic equation. The parameter estimation problem is then formulated and solved using Karush-Kuhn-Tucker. Finally, an explicit solution of estimate parameters such as capacitor and inductor is formulated as an explicit function of the inductor currents and capacitor voltage. Finally, the state variables of the boost converter are numerically obtained and used to test the capability of the proposed work. The results presented in this work prove the MPP algorithm can estimate the boost converter's parameters, which can be extended to other power converters and filters.

Keywords

Boost Converter; Dc-Dc Converter; Multiparametric Programming; Parameter Estimate