

On the enhancement of dc/dc converters dynamics using Gorilla Troop Optimizer based controller design.

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Abstract – DC/DC converters can exhibit highly nonlinear responses when their parameters are changed, such as bifurcation, quasi-periodic, and chaotic responses. In these cases, it is difficult to predict and control the converter's behavior. This paper explores the nonlinear behaviors of a DC/DC buck converter when its parameters are changed (Load, input voltage etc.). The phase plane and the bifurcation diagram are used to identify the various periodicities of the limit cycles. To address this, a solution based on the Gorilla troop optimizer (GTO) is proposed and simulated in MATLAB. Results demonstrate the use of a Aquila optimizer-based controller design can eliminate nonlinear phenomena in DC/DC converters and provide an efficient and cost-effective solution.

Keywords – Buck Converter, Nonlinear Phenomena, Bifurcation, Controller Design, Gorilla Troop Optimizer.
