

順向式轉換器中包含激磁電感操作於電流模式控制對於電路之影響

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摘要

使用電流模式控制(current model control, CMC)的順向式轉換器(forward converter)的小信號模型被推導出來, 其中包含了主電源變壓器激磁電感(magnetizing inductance)也在此推導式中, 我們將得到修正後的前饋增益(feedforward gain)、電流迴路增益(current loop gain)、控制對輸出(control to output)以及聲頻感受度(audio susceptibility)的轉移函數(transfer function)。而經由電流迴路及控制對輸出模擬結果得知, 激磁電感的影響就如同一外加斜波(external ramp)。此作用就是使整個轉換器系統穩定。我們可以利用激磁電感的影響來替代一外加斜波避免錯誤的情況發生。

關鍵字：轉換器;電流模式控制;激磁電感

Modeling of the Forward Converter Including Magnetizing Inductance with Current Mode Control

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Abstract

A small-signal model for forward converter with current-mode control is derived. The magnetizing inductance of the main power transformer is included in the derivation. It is found that the feedforward gain is modified and so are the transfer functions of current loop gain, control to output and audio susceptibility. Simulation results show that the effect of the magnetizing inductance is similar to an external ramp which can stabilize the converter system. The abnormal variation of audio susceptibility gain near null value could be avoidable when considering the magnetizing inductance instead of using an external ramp.

Key words : Converter;Current mode control;Magnetizing inductance