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Simulation and Characterization of the Second order Voltage Operated Charge-Pump phase Locked Loop using Event Driven Technique

ABSTRACT - Masterthesis

The charge-pump phase locked loops (CPPLLs) are widely used in modern integrated circuit (IC) for different applications. The output signal (i.e. current or voltage) of the charge-pump circuit has a great impact on the performance of the CPPLL. When current flowing through the loop filter is varying due to the voltage operated charge-pump structure, the gain of the digital phase detector associated to the charge-pump do not remain constant but varies, causing an increased nonlinear behavior. In this thesis a second order voltage operated CPPLL (VO-CPPLL) model is established based on the exact and nonlinear difference equations. Its peculiar behavior is characterized by the event driven technique. The analytical model of the second order VO-CPPLL is derived by using the constant current approximation. This subsequent model is then compared with the modified approximation model based on the autonomous difference equations. The dynamic response of the second order VO-CPPLL is compared to second order CO-CPPLL and the results of the analysis are presented.