Abstracts

Comparison Between First-Order and Second-Order Optical Phase-Lock Loops

R.T. Ramos and A.J. Seeds. "Comparison Between First-Order and Second-Order Optical Phase-Lock Loops." 1994 Microwave and Guided Wave Letters 4.1 (Jan. 1994 [MGWL]): 6-8.

A comparison between the performance of modified first-order and second-order optical phase-lock loops (OPLL's) is made, revealing that the modified first-order loop offers better performance when long loop delay time is present and a wide bandwidth loop filter is used. The introduction of a 10 dB gain margin from the critical gain can be used to keep the damping close to that expected when the delay time is negligible. If OPLL design is optimized for this gain margin and 5 MHz linewidth lasers are used, the increase in the phase-error variance with delay time is 54 $rad^2/\mu s$ for a modified first-order and 80 $rad^2\mu s$ for a second-order loop, confirming that modified first-order loops are less sensitive to loop delay.

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