

Stability Analysis of Injection-Locked Oscillators in Their Fundamental Mode of Operation

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Phase-lock stability of fundamental-wave injection-synchronized oscillators is investigated on the basis of a new time-domain approach. Starting from a quite general oscillator modeling and assuming single-frequency quasi-static operation, both exact and first-order approximate stability criteria are derived in a fully analytical form suitable for computer implementation. The examples worked out demonstrate good agreement of this theory with experimental observations available in the literature on multiple-tuned oscillators, whose behavior under large-signal injection was so far predictable only through graphical methods.

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