Abstracts

Phase Control of Optically Injection Locked Oscillators for Phased Arrays

A.S. Daryoush, M. Francisco, R. Saedi, D. Polifko and R. Kunath. "Phase Control of Optically Injection Locked Oscillators for Phased Arrays." 1990 MTT-S International Microwave Symposium Digest 90.3 (1990 Vol. III [MWSYM]): 1247-1250.

Future generation of space-based communications systems are envisioned to employ high-speed fiberoptic links for distribution of control and communication signals. The most suitable architecture for millimeter wave frequencies are based on the T/R level data mixing architecture, where a frequency reference is provided to local oscillators in the subarrays to have them frequency and phase synchronized. The indirect subharmonic optical injection locking has benefit of high degree of frequency synchronization up to millimeter wave frequencies, however they suffer from phase inaccuracy over the locking range, first formulated by Adler. In this paper we propose a scheme to measure this phase error and correct for by adjusting the free-running oscillation frequency of a VCO. Experiments supporting this approach are reported for two optically injection locked oscillators at 18GHz, where controlled phase shifts over -90° to 78° are achieved by adjusting the bias current to a YIG tuned VCO.

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