Abstracts

A Push-Pull Self-Oscillating Mixer for Optically Fed Phased Array

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The optical control of the distributed electronics in phased array antennas requires specialized circuits which are compatible with the T/R level data mixing architecture. This paper presents a novel circuit, a push-pull self-oscillating mixer, that can perform three important functions: 1) oscillation, 2) frequency and phase locking to a reference signal, and 3) mixing with the data signals. This proposed circuit performs these three functions efficiently in a low power consuming circuit. Until now, these functions could be done only through independent circuits. This concept was analyzed and experimentally demonstrated at 12 GHz by use of a MESFET pair with a measured conversion efficiency as high as 13 dB and noise figure of 9 dB. Efficient subharmonic injection locking was also demonstrated. This design can be easily extended to HEMT and HBT at higher frequencies.

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