EuroSciCon

EuroSciCon Joint Event on

Laser Optics & Photonics and Atomic & Plasma Science

July 16-17, 2018
Prague, Czech Republic

Am J Compt Sci Inform Technol 2018, Volume 6
DOI: 10.21767/2349-3917-C1-003

A FAST AND ACCURATE APPROACH TO THE COMPUTATION OF OSCILLATION MODES OF WIDEBAND OPTOELECTRONIC OSCILLATORS

S Jahanbakht and S F Mousavi
University of Kashan, Iran

Optoelectronic oscillators (OEOs) with wide band radio frequency (RF) filters can be used to tune the oscillation frequency in a wide range by using a RF phase shifter. Because of the low quality factor of the RF filter in such OEOs, some of the non-fundamental harmonics are not negligible and should be taken into account in the steady state analysis. As in other OEOs, generally there are a number of stable periodic solutions that each of them can be the observed solution depending on the initial conditions. These solutions are called the oscillation modes. A frequency domain approach for computing all the oscillation modes of wideband OEOs is presented. A stability analysis approach is presented for detecting the stability of the computed modes. It is shown that considering an adequate number of harmonics is necessary for an accurate computation of the modes and a valid stability analysis. The advantages of the new approach over time domain approaches to the OEO analysis are the ability to compute all the oscillation modes, instead of only the dominant mode, as well as much less runtime and memory requirements. The validity of the new approach is verified by comparing its results against the time-consuming time domain integrations.

Jahanbakht@kashanu.ac.ir