

This paper introduces a new universal carrier-based pulse width modulation for multiphase converters based on a novel approach for the determination of modulation signals. They are calculated employing the minimum infinity-norm method which is in general suitable for underdetermined systems. The proposed approach minimizes the maximum element of solution vector and finds a unique one in the infinite solution set. Multiphase converters represent a case of systems with multiple degrees of freedom (DOF) allowing the optimization procedure. Modulation signals found by the minimum infinity norm lead naturally to maximum utilization of the dc-link voltage. The proposed approach enables easy modification of number of phases and DOF, respectively, and, thus, it provides a powerful tool for wide range of problems. The universality of the approach is demonstrated on both five- and seven-phase converters with specific demanded voltage vectors. Theoretical assumptions were verified by simulations and experiments on a laboratory prototype of the five-phase converter.