

Analysis of the Performance of the Mark-space Method for Determining the Power in Single-phase Circuits

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Abstract—The electrical power transfer is an essential element of an energy system. Along with frequency and phase, electrical power influences the dimensions and costs involved. The paper presents an analysis of mark-space method, which offers a mathematical solving of power measurement in singlephase AC circuits. Remarkable that it can has analog solution implemented. The existence of electronic circuits with known possibilities, such as the pulse width modulation, absolute value and filtering with operational amplifier, allows the synthesis of specific schemes. This approach avoids multiplying operations that facilitate error generating. The main purposes are to follow the performance of such a circuit in different operating situations and present an example of schematics. Using specific simulation programs but not restricted to them, the results confirmed the method being analyzed.

Keywords— power; mark-space; simulation

REFERENCES

- [1] Schneider Electric, “Electrical installation guide. According to IEC International Standards”, <http://theguide.schneider-electric.com>, Les Deux Ponts Printing, 2007, France.
- [2] C. Ionescu Golovanov, “Measurements in power network”, “Măsurarea mărimilor electrice în sistemul electroenergetic”, Romanian Academy Printing, AGIR Printing, 2009, Bucharest.
- [3] E. Danila, D.D. Lucache, G. Livint, Models and modelling the supercapacitors for a defined application, Annals of the University of Craiova, No. 35, 2011; ISSN 1842-4805, pg.200-205.
- [4] C. Chavez, J. A. Houdek, “Dynamic Harmonic Mitigation and power factor correction”, IEE. Electrical Power Quality, 9–11 Oct. 2007.
- [5] S. L. Campbell, J.-P. Chancelier, R. Nikoukhah, “Modeling and Simulation in Scilab/Scicos”, Springer Edition, 2006.
- [6] P. Mathieu, P. Roux, “Scilab : I. Fundamentals”, Scilab Enterprises, 2016.
- [7] C. Bunks, J. Chancelier, F. Delebecque, C. Gomez, M. Goursat, R. Nikoukhah, and S. Steer, “Engineering and Scientific Computing with Scilab”. Birkhauser, 1999.
- [8] J. H. Mikkelsen, “LTspice – An Introduction”, Technical report, Institute of Electronic Systems, Aalborg University, Aalborg, 2005.