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Abstract

Power Quality Adverse Effects Assessment of Grid-Connected Photovoltaic Systems

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Abstract:

Worldwide, grid-connected photovoltaic systems are being installed at a growing rate, as it is known that this generation source does not pollute nor contributes to global warming and climate change. Technology is advancing and photovoltaic cells are increasing in efficiency and photovoltaic- based generation is becoming more competitive when compared with traditional power plants generation. Practical advantages of photovoltaic generation are, therefore, unquestionable. However, during the practical operation of grid- connected photovoltaic systems several issues have arisen, which require their punctual analysis. For instance, the influence of this type of generation on the stability, reliability and power quality of the electrical network requires to be analyzed in detail.

This work presents an assessment of power quality adverse effects during the operation grid- connected photovoltaic systems. Harmonics, total harmonic distortion, electromagnetic transients, load transients and voltage sags are assessed. The modeling of the photovoltaic array model considers the maximum power point tracking controller, the voltage source DC/DC converter model with a pulse width modulation (PWM) controller, the DC/AC interconnection converter for single-phase and three-phase analysis with sinusoidal PWM controller. The case studies are reported with the use of the simulator PSCAD/EMTDC®, widely accepted by the power industry.

Biography:

Aurelio Medina-Rios. Obtained the Ph.D. degree from the University of Canterbury, Christchurch, New Zealand, in 1992. He was a Postdoctoral Fellow of the Uni-

versity of Canterbury, New Zealand (one year; from 1992-1993), and the University of Toronto, Canada (two years; from 1993-1995). He joined the Facultad de Ingeniería Eléctrica, Universidad Michoacana de San Nicolás de Hidalgo (UMSNH), Morelia, in 1995. His research interests are in the analysis of power quality

phenomena, dynamic and steady state analysis of power systems, renewable energy systems, and the applications of advanced numerical and computer techniques to power system analysis.

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