World Academy of Science, Engineering and Technology
International Journal of Information and Communication Engineering
Vol:10, No:06, 2016

A Simple and Efficient Method for Accurate Measurement and Control of Power Frequency Deviation

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Abstract : In the presented technique, a simple method is given for accurate measurement and control of power frequency deviation. The sinusoidal signal for which the frequency deviation measurement is required is transformed to a low voltage level and passed through a zero crossing detector to convert it into a pulse train. Another stable square wave signal of 10 KHz is obtained using a crystal oscillator and decade dividing assemblies (DDA). These signals are combined digitally and then passed through decade counters to give a unique combination of pulses or levels, which are further encoded to make them equally suitable for both control applications and display units. The developed circuit using discrete components has a resolution of 0.5 Hz and completes measurement within 20 ms. The realized circuit is simulated and synthesized using Verilog HDL and subsequently implemented on FPGA. The results of measurement on FPGA are observed on a very high resolution logic analyzer. These results accurately match the simulation results as well as the results of same circuit implemented with discrete components. The proposed system is suitable for accurate measurement and control of power frequency deviation.

Keywords : digital encoder for frequency measurement, frequency deviation measurement, measurement and control systems, power systems
Conference Title : ICCT 2016 : International Conference on Communication Technology
Conference Location : London, United Kingdom
Conference Dates : June 23-24, 2016

Open Science Index, Information and Communication Engineering Vol:10, No:06, 2016 publications.waset.org/abstracts/44000/pdf