Implementation of virtual instruments as a power quality analysis tool

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ABSTRACT

Virtual instruments (VI) offer flexibility to engineers in the tasks of measurement and monitoring in many fields of study and various industries. The use of graphical programming in VI helps create a user-defined solution that caters to specific needs. VI increases productivity and decreases costs for test, control and design applications by integrating software, such as the National Instrument Laboratory VI Engineering Workbench (LabVIEW), modular measurement and control hardware with different connections, such as PXI, PCI, USB and Ethernet. The harmonic components need to be measured to analyze power quality. The electrical supply that flows through non-linear loads produces harmonics that disturb the functions of other equipment connected to the same supply. The harmonic, voltage and current VIs that are available in the LabVIEW software are used to analyze power quality, so that appropriate actions can be taken to reduce disturbances. The power equipment is remotely monitored using the VIs. The data are analyzed at the low power side, in contrast to traditional power quality analysis tools, which analyze data at the captured side. This approach can provide a safer operation for system users.

KEYWORDS

Laboratory virtual instrument engineering workbench (labview); Power; Power quality analyzer; Total harmonic distortion (thd); Virtual instruments (vis)

REFERENCES

1. Senthilnathan, N., Manigandan, T.
   Virtual Harmonic Analyser-harmonic analysis and estimation of THD using LabVIEW
   (2009) *Proceedings of the International Conference on Man-Machine Systems (ICoMMS)*, pp. 1-6., BatuFerringhi, Penang, Malaysia,October

2. Dwivedi, V., Singh, D.
   Electric power quality monitoring (PQM) using Virtual Instrumentation
   (2010) *SPEEDAM 2010 - International Symposium on Power Electronics, Electrical Drives, Automation and Motion*, art. no. 5545058, pp. 431-436.
   ISBN: 9781424449873
   doi: 10.1109/SPEEDAM.2010.5545058

3. Winn, J.K., Crow, D.R.
   Harmonic Measurements Using A Digital Storage Oscilloscope
   (1989) *IEEE Transactions on Industry Applications*, 25 (4), pp. 783-788.
   doi: 10.1109/28.31261

4. Lina, C., Yanqiu, H., Deqiang, J., Weibo, Y.
   Detection of power quality analyzer
   (2010) *2010 International Conference on Computer, Mechatronics, Control and Electronic Engineering, CMCE 2010*, 4, art. no. 5610125, pp. 429-431.
   ISBN: 9781424479566
   doi: 10.1109/CMCE.2010.5610125

5. Katalin, A.
   Acquisition system for power measurements and harmonics determination
   (2010) *2010 IEEE International Conference on Automation, Quality and Testing, Robotics, AQTR 2010 - Proceedings*, 2, art. no. 5520817, pp. 133-136.
   ISBN: 9781424467259
   doi: 10.1109/AQTR.2010.5520817