

Mitigation of Electromagnetic Interference Generated by GPIB Control-Network in AC-DC Transfer Measurement System

Authors : M. M. Hlakola, E. Golovins, D. V. Nicolae

Abstract : The field of instrumentation electronics is undergoing an explosive growth, due to its wide range of applications. The proliferation of electrical devices in a close working proximity can negatively influence each other's performance. The degradation in the performance is due to electromagnetic interference (EMI). This paper investigates the negative effects of electromagnetic interference originating in the General Purpose Interface Bus (GPIB) control-network of the ac-dc transfer measurement system. Remedial measures of reducing measurement errors and failure of range of industrial devices due to EMI have been explored. The ac-dc transfer measurement system was analyzed for the common-mode (CM) EMI effects. Further investigation of coupling path as well as more accurate identification of noise propagation mechanism has been outlined. To prevent the occurrence of common-mode (ground loops) which was identified between the GPIB system control circuit and the measurement circuit, a microcontroller-driven GPIB switching isolator device was designed, prototyped, programmed and validated. This mitigation technique has been explored to reduce EMI effectively.

Keywords : CM, EMI, GPIB, ground loops

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020