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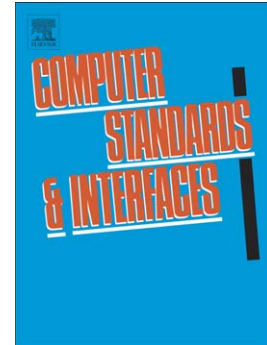
Performance Analysis of Power Line Communication in Industrial Power Distribution Network

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Performance Analysis of Power Line Communication in Industrial Power Distribution Network

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Nowadays, Smart Grid applications are widely diffused in power grids and home automation. In these application fields, several communication technologies (wired and wireless) are commonly adopted. However, industry applications are very sensible to installation costs: the Power Line Communication (PLC) seems to be one of the best trade-off between cost and benefit for implementing Smart Grids in industrial context. Unfortunately, industrial environment may compromise the reliability of PLC technologies due to noisy communication channel, bad design, old cabling, and interfering/competing PLC communication systems used in heterogeneous manner. In this work, a multi-protocol instrument for power line channel characterization and communication performance estimation is presented. The proposed solution is able to characterize and to decode several PLC systems with different physical modulations thanks to a software-defined architecture. A working prototype of the proposed instrument has been built and characterized. Last, a case study is presented; the proposed instrument has been used in a real industrial plant in order to study the potential issues on the power line that can affect the PLC communication.

Index Terms— Power Line Communication; Low-Voltage Grid; Communication Performance; Software Defined Radio; Quality of the Service; Industrial Communication;

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