

SUMMARY:

Power quality is nowadays an interesting topic due to both the liberalization processes of electric power sector and an increasing concern of the final user for obtaining a product at a low cost and, if possible, with the higher quality standards. This coordinated research project approaches this problem from the quality of the voltage waveform point of view. The main objectives can be summarized as follows:

- a) Power quality measurement. Two objectives can be pointed out within this research area:
 - Determination of the optimal number and location of power quality analyzers to obtain a given information level about the monitored electric power system.
 - Power quality surveys at different geographical locations in order to prove the fulfilment of the actual normative.
- b) Harmonic and voltage fluctuation effects. The interest is focused on obtaining results about the possible mechanical vibrations due to harmonics and the decrease of the expected life of the loads due to additional losses.
- c) Voltage sag propagation in distribution power systems. The objective is to know the principles of voltage sag transmission in this special type of power systems in order to evaluate, once the problem has been generated, the affected geographical area. In addition, it should be required the formulation of a new algorithm providing the location where the voltage sag has been originated.
- d) Harmonic mitigation in electric power systems. New contributions to the design of passive, active and hybrid filters will be proposed in order to obtain an economical and technical-competitive filtering method. These contributions affect to:
 - Topologies. New passive filter topologies will be proposed: wide band filter and third harmonic filter.
 - Design method. Optimization methods will be applied to design the filters (passive and hybrid types), using several design criteria throughout adequate objective functions. In addition, the variation of some parameters with time (supply conditions, linear and non-linear loads, etc.) will be taken into account.