Intenational collaboration in education and research: active noise and vibration control example

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ABSTRACT

The paper concerns the possibilities of international collaboration in education and research based on tele-laboratories and virtual laboratories. The author of this paper participated in the methodology development and implementation of active noise and vibration control tele-laboratory at the Silesian University of Technology (SUT). The Industrial Control Group at SUT is involved in the active noise control research based on the theory of systems and adaptive control concepts for several years. Successful results have been obtained with respect to the problems of noise attenuation in acoustic ducts, personal noise attenuators, as well as the creation of zones of silence. The active noise and vibration control problems are also present in education at Silesian University of Technology – there are non-obligatory courses concerning the theoretical and implementational issues in these fields. The lectures are accompanied by the laboratory exercises which are also used with other courses, including Adaptive Control, Digital Signal Processing and Microprocessor Techniques.
The equipment used for active noise and vibration control laboratory exercises is rather unique and of high cost, the laboratory room is typically filled with many microphones, loud-speakers and other equipment. Therefore it was decided to enable the access to the active noise laboratory at SUT in the form of tele-laboratory by means of computer network. At the same time the author of the paper has successfully applied with 9 other universities for the international collaboration project called LABLINK focusing on building tele-laboratories and virtual laboratories at the participating institutions and cross-accessing them by the students from the project partners institutions. The tele- and virtual laboratories built as part of LABLINK project covered several important areas of engineering education, especially with respect to electrical and mechanical engineering.
The LABLINK project resulted in the set of laboratories with the possibility of Internet based access, the methodological guidelines concerning the usage of such laboratories in education, and – what is probably the most important result – the examples of virtual international exchange of students by means of using the tele-laboratories via Internet, typically with some help from local tutor. On the other hand the tele-laboratory platform can be easily used to build the international research-oriented contacts, e.g. by enabling the collaborating scientists from other universities access to the active noise control laboratory at Silesian University of Technology. Thus the LABLINK project could be viewed as the successful example of enhancing the possibilities of international collaboration in education and research by using the concept of tele-laboratories and virtual laboratories.