COB282 CAVITATION DETECTION IN HYDROTURBINES USING NEURAL NETWORKS

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This paper refers to the development of a methodology to detect cavitation in hydroturbines using a neural network strategy. Both experimental tests and theoretical analysis were carried out. Initially, the methodology of mapping the cavitation regimes in Francis turbines was proposed and tested. The neural network reproduced satisfactorily the different types of cavitation. A real scale experiment was also performed in a 160 MW Francis Turbine in operation at the electric power station in Ilha Solteira/São Paulo (CESP). Acoustic sensors were used to perform preliminary tests on cavitation radiated noise, in order to detect cavitation for different conditions of turbine operations. The neural network methodology was also proposed to analyze these experimental data. A description of laboratory facilities and some results obtained up to this moment can also be found in this paper.

Keywords: *Cavitation, TurboMachinery, Neural Networks and Neuro-Genetic Systems/Cavitação, Máquinas Hidráulicas, redes neurais e sistemas neuro-genéticos.*

COB410 REDES NEURAIS APLICADAS AO CONTROLE DE ATITUDE DE SATÉLITES ARTIFICIAIS COM APÊNDICES FLEXÍVEIS / *NEURAL NETWORK APPLIED TO ATTITUDE CONTROL FOR ARTIFICIAL SATELLITE WITH FLEXIBLE APPENDAGES*

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This work demonstrates that artificial neural networks can be used effectively for satellite attitude dynamics identification and control. In order to exemplify this application, a satellite with a rigid main body, three reaction wheel and three flexible solar panel was chosen (lay-out similar to Brazilian Remote Sensing Satellite) The main objectives of this work are to test the neural control and analyze the interaction between the control system and the elastic motion of the satellite solar arrays. The equations of motion were derived by the Lagragian approach for quasi-coordinates (rotational motion) and for generalized coordinates (elastic motion).The identification of neural nets parameters is performed by Kalman filtering algorithm with a local parallel processing version.

Keywords: *Redes neurais artificiais, sistemas não lineares, filtro de Kaman, controle de atitude. Artificial neural networks, non-linear system, Kalman filtering, satellite attitude control.*