



The challenge of inserting intermittent energy generation into the Brazilian hydrothermal optimal dispatch

Prof. Reinaldo Castro Souza
Industrial Engineering Dept, PUC-Rio
Rio de Janeiro, Brazil

Brazil has a total of 4.648 power generation projects in operation, totaling 161 GW of installed capacity, where 74% comes from hydroelectric power plants and 6% from intermittent generation sources (wind and solar). An addition of 25 GW is scheduled for the next few years in the country's generation capacity, where 43% of this increment will come from intermittent sources. Nowadays, planning the Brazilian energy sector means, basically, making decisions about the dispatch of hydroelectric and thermoelectric plants where the operation strategy minimizes the expected value of the operation cost during the planning period, which is composed of fuel costs plus penalties for failure in supplying the projected expected load. Given the growing trend of intermittent generation in the Brazilian energy matrix, it is necessary to include this type of generation into the optimal approach dispatch currently used, so that this type of generation is effectively considered in the long term planning. This work aims to develop and apply a new methodology to include the uncertainty of this kind of intermittent generation, particularly, the wind power plants, to develop the Hydro-Wind-Thermal optimal dispatch.

Keywords: Hydro, Thermal-wind power generation, optimal dispatch, demand forecast, inflow and wind speed uncertainties.



Reinaldo Castro Souza is graduated in Electrical Engineer from State University of Juiz de Fora, Brazil, has a master degree in systems engineering from the Pontifical University of Rio de Janeiro (PUC-Rio) and a PhD in Statistics and Forecasting from the Warwick University, UK. He also holds a Post-doctorate in econometrics from London School of Economics, UK. He is a Full Professor at the Industrial Engineering Dept of PUC-Rio. From 2011 onwards he became a member of the Brazilian Academy of Engineering. He is also an elected member of the board of the International Institute of Forecasters.

He has already supervised over 50 doctorate thesis and nearly 100 master dissertation. Has published regularly in reputable journals in energy, statistics and forecasting. He has developed many R&D projects for the Brazilian distributing and generating utilities and act as a consultant for the Brazilian national electrical energy regulator (ANEEL).