A nonlinear programming approach to optimal static generation expansion planning

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Abstract-

It is shown how a standard nonlinear programming approach can be applied to solve a sophisticated version of the static optimal mix problem in generation planning. The model presented includes technical minima of thermal capacity, detailed operating models of storage-hydro and pumped-hydro units, a realistic model of capital costs for hydro plants, operating reserve and minimum demand constraints, and capacity already in existence. The model formulation is in a format that can be directly handled by the well-known MINOS code and can be efficiently solved. The use of a general-purpose nonlinear optimization program results in a great flexibility, making it possible to modify the model formulation easily or to adapt it to the characteristics of a particular electric system. A realistic application to the Spanish generation system is presented

Index Terms-

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