

**Author(s):** Catalao, JPS (Catalao, J. P. S.); Mariano, SJPS (Mariano, S. J. P. S.); Mendes, VMF (Mendes, V. M. F.); Ferreira, LAFM (Ferreira, L. A. F. M.)

**Title:** Nonlinear optimization method for short-term hydro scheduling considering head-dependency

**Source:** European Transactions on Electrical Power, 20 (2): 172-183 MAR 2010

**Language:** English

**Document Type:** Article

**Author Keywords:** short-term hydro scheduling; nonlinear optimization; cascaded reservoirs; head-dependency

**KeyWords Plus:** Hydrothermal Power-Systems; Electricity Market; Neural-Network; Thermal Units; Algorithm; Constraints; Chain; Price; Flow

**Abstract:** This paper is on the problem of short-term hydro scheduling, particularly concerning head-dependent reservoirs under competitive environment. We propose a new nonlinear optimization method to consider hydroelectric power generation as a function of water discharge and also of the head. Head-dependency is considered on short-term hydro scheduling in order to obtain more realistic and feasible results. The proposed method has been applied successfully to solve a case study based on one of the main Portuguese cascaded hydro systems, providing a higher profit at a negligible additional computation time in comparison with a linear optimization method that ignores head-dependency. Copyright (C) 2008 John Wiley & Sons, Ltd.

**Addresses:** [Catalao, J. P. S.; Mariano, S. J. P. S.] Univ Beira Interior, Dept Electromech Engr, P-6201001 Covilha, Portugal; [Mendes, V. M. F.] Inst Super Engr Lisboa, Dept Elect Engr & Automat, P-1950062 Lisbon, Portugal; [Ferreira, L. A. F. M.] Inst Super Tecn, Dept Elect & Comp Engr, P-1049001 Lisbon, Portugal

**Reprint Address:** Catalao, JPS, Univ Beira Interior, Dept Electromech Engr, P-6201001 Covilha, Portugal.

**E-mail Address:** catalao@ubi.pt

**Publisher:** John Wiley & Sons LTD

**Publisher Address:** THE ATRIUM, SOUTHERN GATE, CHICHESTER PO19 8SQ, W Sussex, ENGLAND

**ISSN:** 1430-144X

**DOI:** 10.1002/etep.301

**ISO Source Abbrev.:** Eur. Trans. Electr. Power

**ISI Document Delivery No.:** 57900