

Author(s): Catalao, JPS (Catalao, J. P. S.); Pousinho, HMI (Pousinho, H. M. I.); Mendes, VMF (Mendes, V. M. F.)

Title: Scheduling of head-dependent cascaded hydro systems: Mixed-integer quadratic programming approach

Source: Energy Conversion and Management, 51 (3): 524-530 MAR 2010

Language: English

Document Type: Article

Author Keywords: Hydro scheduling; Mixed-integer quadratic programming; Head-dependency

KeyWords Plus: Electricity Market; Differential Evolution; Power-Generation; Chain; Optimization; Constraints; Reservoir; Prices; Plant; Units

Abstract: This paper is on the problem of short-term hydro, scheduling, particularly concerning head-dependent cascaded hydro systems. We propose a novel mixed-integer quadratic programming approach, considering not only head-dependency, but also discontinuous operating regions and discharge ramping constraints. Thus, an enhanced short-term hydro scheduling is provided due to the more realistic modeling presented in this paper. Numerical results from two case studies, based on Portuguese cascaded hydro systems, illustrate the proficiency of the proposed approach. (C) 2009 Elsevier Ltd. All rights reserved.

Addresses: [Catalao, J. P. S.; Pousinho, H. M. I.] Univ Beira Interior, Dept Electromech Engr, P-6201001 Covilha, Portugal; [Mendes, V. M. F.] Inst Super Engr Lisboa, Dept Elect Engr & Automation, P-1950062 Lisbon, Portugal

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

E-mail Address: catalao@ubi.pt

Publisher: Pergamon-Elsevier Science LTD

Publisher Address: THE BOULEVARD, LANGFORD LANE, KIDLINGTON, Oxford OX5 1GB, ENGLAND

ISSN: 0196-8904

DOI: 10.1016/j.enconman.2009.10.017

ISO Source Abbrev.: Energy Conv. Manag.

ISI Document Delivery No.: 549YI