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

Title: Mixed-integer nonlinear approach for the optimal scheduling of a head-dependent hydro chain

Abstract: This paper is on the problem of short-term hydro scheduling (STHS), particularly concerning a head-dependent hydro chain We propose a novel mixed-integer nonlinear programming (MINLP) approach, considering hydroelectric power generation as a nonlinear function of water discharge and of the head. As a new contribution to eat her studies, we model the on-off behavior of the hydro plants using integer variables, in order to avoid water discharges at forbidden areas Thus, an enhanced STHS is provided due to the more realistic modeling presented in this paper Our approach has been applied successfully to solve a test case based on one of the Portuguese cascaded hydro systems with a negligible computational time requirement. (C) 2010 Elsevier B V. All tights reserved.

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

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