

Turkish Journal of Electrical Engineering & Computer Sciences

Turkish Journal

of

Online Tuning of Set-point Regulator with a Blending Mechanism Using PI Controller

Electrical Engineering &
Computer Sciences

Engin YEŞİL, Müjde GÜZELKAYA, İbrahim EKSİN, Ö. Aydın TEKİN
İstanbul Technical University, Faculty of Electrical and Electronics Engineering,
Control Engineering Department, Maslak, 34469, İstanbul-TURKEY
e-mail: yesil@elk.itu.edu.tr, gkaya@elk.itu.edu.tr,
e-mail: eksin@elk.itu.edu.tr, tekin@elk.itu.edu.tr

 [Keywords](#)
 [Authors](#)



elektrik@tubitak.gov.tr

[Scientific Journals Home Page](#)

Abstract: In this paper, a new control structure that exploits the advantages of one degree of freedom (1-DOF) and two degree of freedom (2-DOF) control structures with an online tuned set-point regulator with blending mechanism (SPR-BM) is proposed. In this structure, the filtered output of the reference and the pure reference signals are blended so that the overall performance of the system is ameliorated with respect to load disturbance rejection and set-point following. Internal Model Control (IMC) based PI controller is used as the primary controller and the blending dynamics are determined with the aim of producing a system output that tries to match to the filtered reference signal. After performing certain manipulations through some approximations, the resulting blending dynamics turn out to be a constant within the range of zero and one. Then, an online intelligence is injected into SPR-BM that changes the blending constant between its extreme values. The effectiveness of the proposed structure is shown both on a simulation example and on a PT-326 heat transfer process trainer experimental setup.

Key Words: Set-point regulator, two degrees of freedom (2-DOF) control structure, PI controllers, internal model control (IMC), disturbance rejection, heat transfer

Turk. J. Elec. Eng. & Comp. Sci., **16**, (2008), 143-157.

Full text: [pdf](#)

Other articles published in the same issue: [Turk. J. Elec. Eng. & Comp. Sci.,vol.16,iss.2.](#)