

Numerical Simulation and Control of Mechanical and Mechatronic Systems

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Symmetry is presented in many mechanical systems and control design methods. This is a critical problem in the system and the control method. Therefore, this Special Issue includes topics with applications and innovations of the simulations analysis and control methodologies of the mechanical and mechatronic systems. Manuscripts discussing the implementation and development of the advanced methods of the analysis and control for mechanical and mechatronic systems are focused on disturbance rejection technologies with a high-order disturbance observer, a nonlinear disturbance observer, a super-twisting disturbance observer, a sliding mode disturbance observer, an equivalent input disturbance observer, a fixed-time disturbance observer, etc. Regarding robust control, adaptive control, fuzzy logic control, neural network control, sliding mode control, and linear and nonlinear control design are strongly recommended. Particularly, the combination of fault-tolerant and state observer-based control is strongly recommended. However, this is not limited to other control methods. Regarding vibration control and isolation, the robust control methods and isolation for the nonlinear vibration structure and machinery are also welcome for this Special Issue. In particular, the new method for rejecting the thermal changing, fabrication errors, and outside effects of the vibration systems is strongly recommended.

Among the accepted papers, Le et al. [1] discussed the adaptive sliding mode control for the serial robot system. The paper focused on the faulty problem with an adaptive sliding mode consideration. In ref. [2], Liu and Wing presented the adaptive algorithm for identifying polynomial coefficients of micro-piezoelectric actuators by applying the least mean method. In ref. [3], Nguyen et al. proposed a new disturbance observer for the bearingless system, which worked based on the inversed model of the physical system. In ref. [4], an optimal design and analysis for a new 1-DOF compliant. A new disturbance observer based on the controller for secure communication of the chaos-based system was provided in [5] to assure the security of the data transmission. Zhang et al. [6] presented the dynamic behaviors of optimized K12 anti-ram bollards. An adaptive dynamic terminal sliding mode control based on a finite-time disturbance observer for nonlinear systems was proposed in [7]. A dual time-scale sliding mode control for the synchronous motor was provided in [8]. A nonlinear dynamic model based on the geographic coordinates and a compound control method based on the adaptive extended state observer (ESO) and adaptive back-stepping integral sliding mode control (SMC) is proposed in [9]. The disturbance rejection for the permanent magnet synchronous motors was presented in [10].

In conclusion, the guest editors did their best to cover major topics of “Numerical Simulation and Control of Mechanical and Mechatronic Systems”. Of course, the guest editor would like to thank the editor-in-chief, the editorial team, and the reviewers of Symmetry who helped us in this long journey.

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