Special Issue

Intelligent Computing in Optimal Design of Actuators

Message from the Guest Editor

The process of actuator design has to incorporate many technical aspects and restrictions. For such systems, the necessity of taking into consideration interactions between different physical fields is indispensable. Accordingly, the optimal design of actuators requires the consideration of many criteria, which depend on quantities such as actuation force, generated displacement, heat or electrical losses, stress concentration, dynamic characteristics, durability, costs, etc. Such criteria depend strongly on the geometry of the actuator and its working conditions. This leads to the need to solve different optimization tasks, such as: shape optimization, topology optimization, boundary condition optimization, etc... This Special Issue will be devoted to topics related to the shape, topology, and boundary conditions optimization (single and multiobjective) of actuators by means of artificial intelligence methods such as: artificial neural networks, genetic and evolutionary algorithms, artificial immune systems, hybrid and memetic optimization methods, particle swarm optimizers, and other metaheuristics.

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Deadline for manuscript submissions

closed (30 June 2021)

Actuators

an Open Access Journal by MDPI

Impact Factor 2.3
CiteScore 4.3

mdpi.com/si/44616

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About the Journal

Message from the Editorial Board

We are just entering the Next Wave of Technology (NWT) where actuators will play the same role as the computer chip did for computers/social media approximately four decades ago. Just in the U.S., production of $1 trillion year of electromechanical systems (vehicles, orthotics, manufacturing cells, freight trains, aircraft, etc.) will be impacted by the NWT, all driven by actuators. Five key trends can be found for the future perspectives: “Performance to Reliability”, “Hard to Soft”, “Macro to Nano”, “Homo to Hetero” and “Single to Multi functional”. We invite papers that primarily impact these economic sectors; those illustrating basic scientific principles are also welcome.

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