
System for multicriteria design of strain gauge load cells having axis symmetrical elastic elements

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This paper briefly touches upon the mechanics of strain gauge load cells and states the problem of strain gauge load cell design. The mentioned problem is subdivided into two tasks: picking and choosing the shape and the dimensions of the elastic element, and finding the right spots for mounting strain gauges on the elastic element. We created a system for designing strain gauged load cells having axis symmetrical elastic elements. The system implements the method of parameter space investigation and utilizes capabilities of the CAE system ANSYS. The system's capabilities are demonstrated by designing a load cell for Weigh-In-Motion scales. Solution of this design problem comprises defining the parameter space and setting the values of the criteria constraints. We investigated the parameter space using the system mentioned above. Finally, we developed a finite-element model of the load cell being designed. The numerical experiments resulted in a Pareto-feasible set, which is given to the Decision Maker, so that he could choose the best option.

Keywords: multicriteria design, finite-element method, elastic element, the parameter space investigation method, strain gauge

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