Optimization design of energy storage flywheel rotor

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How to optimize a flywheel rotor in multidimensional space?
We first build the shape optimization model of flywheel by parametric geometry modeling method with the objective to maximize the energy density of a flywheel rotor. Then the downhill simplex method is adopted to solve the nonlinear optimization problem in multidimensional space.

How to solve the excessive vibration of an energy storage flywheel rotor?
Part of the book series: Mechanisms and Machine Science ((Mechan. Machine Science,volume 140)) To solve the excessive vibration of an energy storage flywheel rotor under complex operating conditions, an optimization design method used to the energy storage flywheel rotor with elastic support/dry friction damper (ESDFD) is proposed.

Does allowable stress affect the optimal shape of a flywheel rotor?
In the meantime,we consider the allowable stress effect on the optimal shape of the flywheel rotor. It is found that the optimized shape of the flywheel rotor is changed with the allowable stress. In general,the flywheel should first satisfy the requirement of energy storage capacity. The rotor of flywheel provides most of the kinetic energy.

Are energy storage Flywheel rotors more sensitive to unbalance?
The following conclusions are drawn from the work: The energy storage flywheel rotor with ESDFDs designed by the optimization design method of this paper is less sensitiveto the unbalance and the damping performance of ESDFDs is improved by 25% -40%.

Analysis and optimization of a novel energy storage flywheel for improved energy capacity. Kinetic/Flywheel energy storage systems (FESS) have re-emerged as a vital technology in ...

In this section we are going to look at optimization problems. In optimization problems we are looking for the largest value or the smallest value that a function can take.

A branch of mathematics which encompasses many diverse areas of minimization and optimization. Optimization theory is the more modern term for operations research.

Various design variables have been investigated for the optimization of the composite rotor and hub design for FES. A list of the most relevant design variables is given below:

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