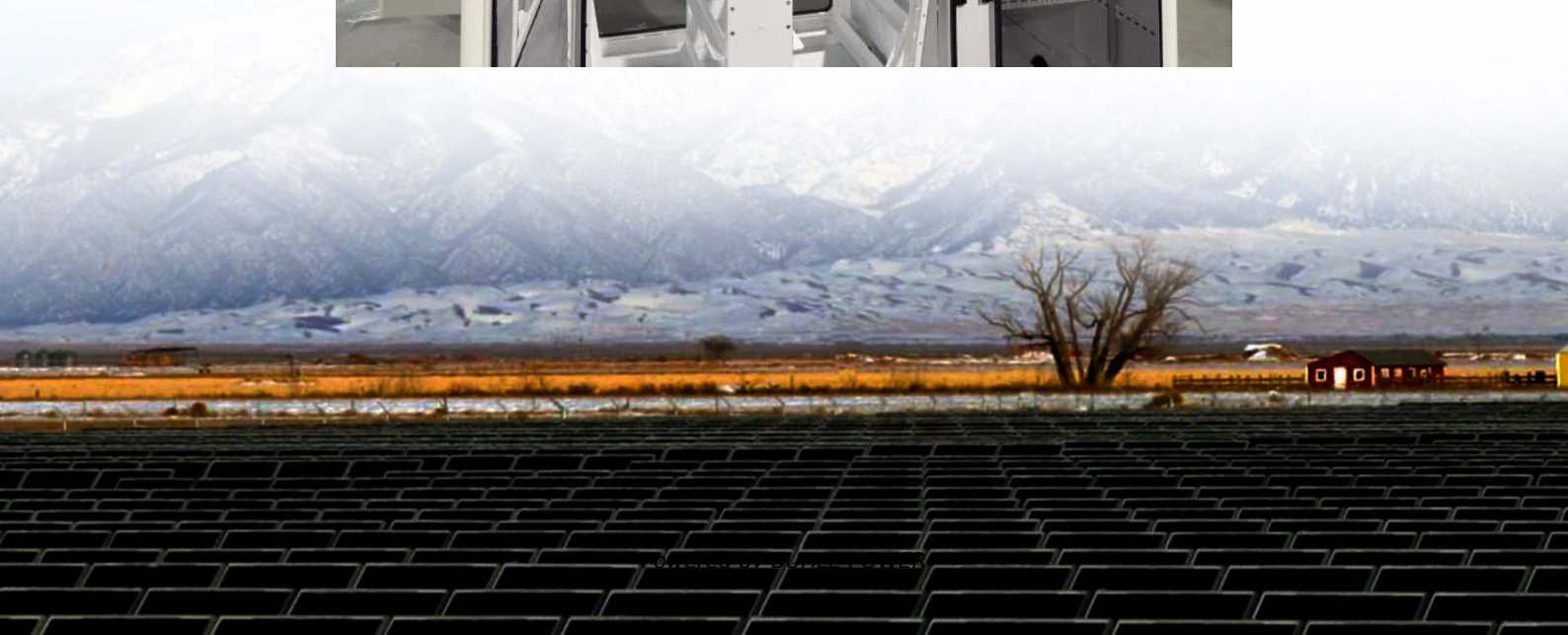


Optimization design of energy storage flywheel rotor





Overview

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.

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.

How does a flywheel energy storage system work?

The flywheel energy storage system mainly stores energy through the inertia of the high-speed rotation of the rotor. In order to fully utilize material strength to achieve higher energy storage density, rotors are increasingly operating at extremely high flange speeds.

How to improve the stability of the flywheel energy storage single machine?

In the future, the focus should be on how to improve the stability of the flywheel energy storage single machine operation and optimize the control strategy of the flywheel array. The design of composite rotors mainly optimizes the operating speed, the number of composite material wheels, and the selection of rotor materials.



Optimization design of energy storage flywheel rotor



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[Kainat Riaz¹, Syeda Fatima Imam¹, Nida Ilyas¹, Zia ul](#)

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