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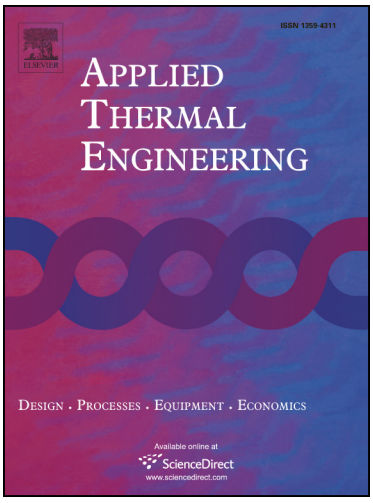

Temperature distributions of an open grooved disk system during engagement

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ACCEPTED MANUSCRIPT

Temperature distributions of an open grooved disk system during engagement

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Research Highlights

- *Heat transfer of two grooved disks during engagement is investigated.*
- *Contact temperature distribution is affected by the sliding speed direction.*
- *Temperature distribution is asymmetrical between the radial grooves.*
- *Contact temperature in the centre area increases along the rotation direction.*

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Abstract: To propose an efficient method for the cooling analysis of the wet clutches, the temperature distributions of an open grooved disk system during engagement are investigated. The coupled heat transfer method considering the fluid and the solid interaction is applied to build the heat transfer model of the open grooved disk system. The corresponding experimental apparatus have also been established. The temperature distributions of the disks under different operation conditions are investigated. The temperature distribution at different times are calculated. The simulated and measured rising temperatures of the disks are also proposed to validate the numerical method. The effects of the flow rate, the inlet flow temperature and the rotating speed on the disk temperature distributions have been studied in detail. The results are useful for the advanced precision cooling mechanism design of the wet clutch.

Key words: Rotor-stator disks; heat transfer; grooved disk; temperature distribution; wet clutch; CFD.

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