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Numerical study of wheel-rail impact contact solutions at an insulated rail joint

Zhen Yang , Anthonie Boogaard , Zilong Wei , Jinzhao Liu , Rolf Dollevoet , Zili Li

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## Highlights:

- An explicit finite element method is applied to simulate wheel-IRJ impact contact.
- The method couples high-frequency dynamics with complex contact in one simulation.
- The validity of the calculated transient solutions is confirmed in several aspects.
- Wave patterns are produced both before and during the simulated wheel-IRJ impacts.
- This paper may contribute to the study of the degradation of IRJs under impacts.

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