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A simple method of analysis of partial slip in shrink-fitted shafts under torsion

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Highlights

- A method of solution for the partial slip problem of a shrink-fitted shaft under torsion is proposed, using the superposition of simple plane problems solved with FEM.
- After superposition of the two problems, we impose that the mode III stress intensity factor is zero at the stick-slip boundary.
- The mode III problems are simplified using a thermal analogy.
- The method permits therefore a solution to be achieved without having to actually implement a frictional rule into the numerical solution.
- We then discuss the solution obtained as a function of the geometrical main parameters, and we find that the extent of the slip zone cannot be found accurately by simple beam theory nor with recent analytical solutions which assume constant pressure of the shrink fit.

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