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Work-of-indentation coupled to contact stiffness for calculating elastic modulus by instrumented indentation

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Highlights

- Instrumented indentation is performed on various metals and alloys.
- Frame compliance of the instrument is taking into account for accurate measurements.
- A new relationship between the elastic recovery energy to the total work-of-indentation ratio and the applied load to the square of the contact stiffness ratio is proposed.
- A proportionality factor has been found by both finite elements method and inverse analysis for the material presenting an intermediate mechanical behavior.
- The values of elastic modulus obtained from the new relationship are in a very good agreement with the theoretical values given in literature.

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