A two-state hysteresis model for bolted joints, with minor loops from partial unloading

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Highlights

- ABAQUS study of cyclically loaded lap joints with a single bolt and with two bolts.
- Narrow hysteresis loops are found. These computationally obtained hysteresis loops are normalized.
- An unconventional two-state hysteresis model is successfully used to describe the normalized loops.
- The two-state model has two fitted parameters only.
- For single bolted joints, the same hysteresis model works well over a range of friction coefficients and bolt preloads.