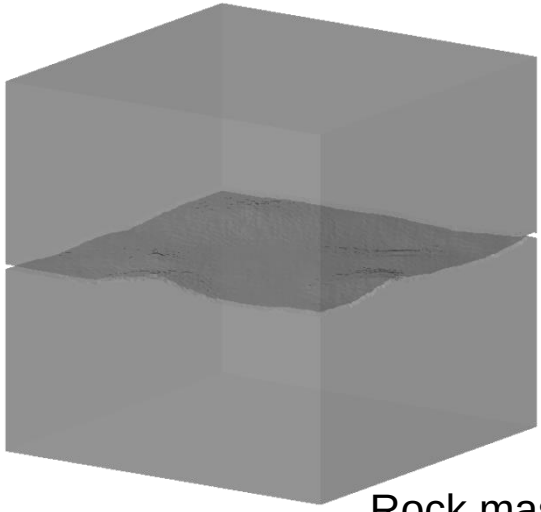
Journal of Zhejiang University-SCIENCE A
(Applied Physics & Engineering)

Grid-growth method for the reconstruction of 3D rock joints with arbitrary joint roughness and persistence

Hanyu CHEN, Peng GUO, Guangyao LI, Lifeng FAN

Cite this as: Hanyu CHEN, Peng GUO, Guangyao LI, Lifeng FAN, 2025. Grid-growth method for the reconstruction of 3D rock joints with arbitrary joint roughness and persistence. *Journal of Zhejiang University-SCIENCE A (Applied Physics & Engineering)*, 26(5):393-406. https://doi.org/10.1631/jzus.A2400407

Reconstruction of Rock Joints

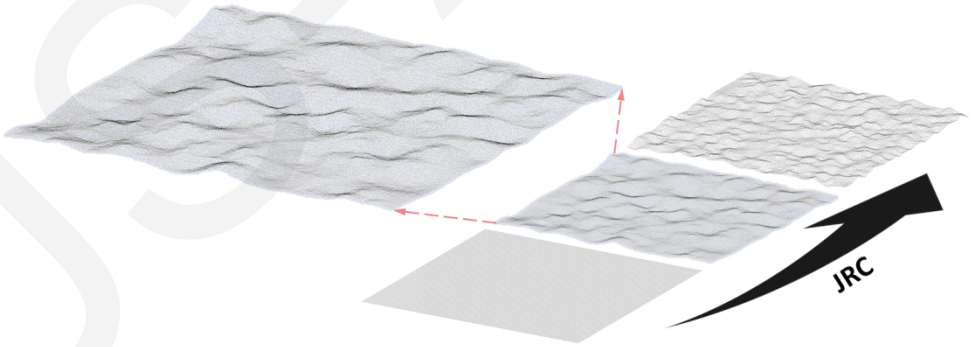


Rock mass

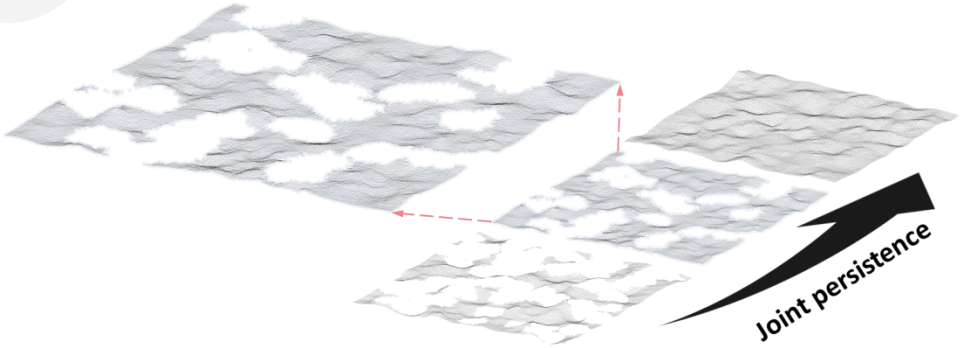
Joint

Joint morphology

Joint roughness varies



Joint persistence varies

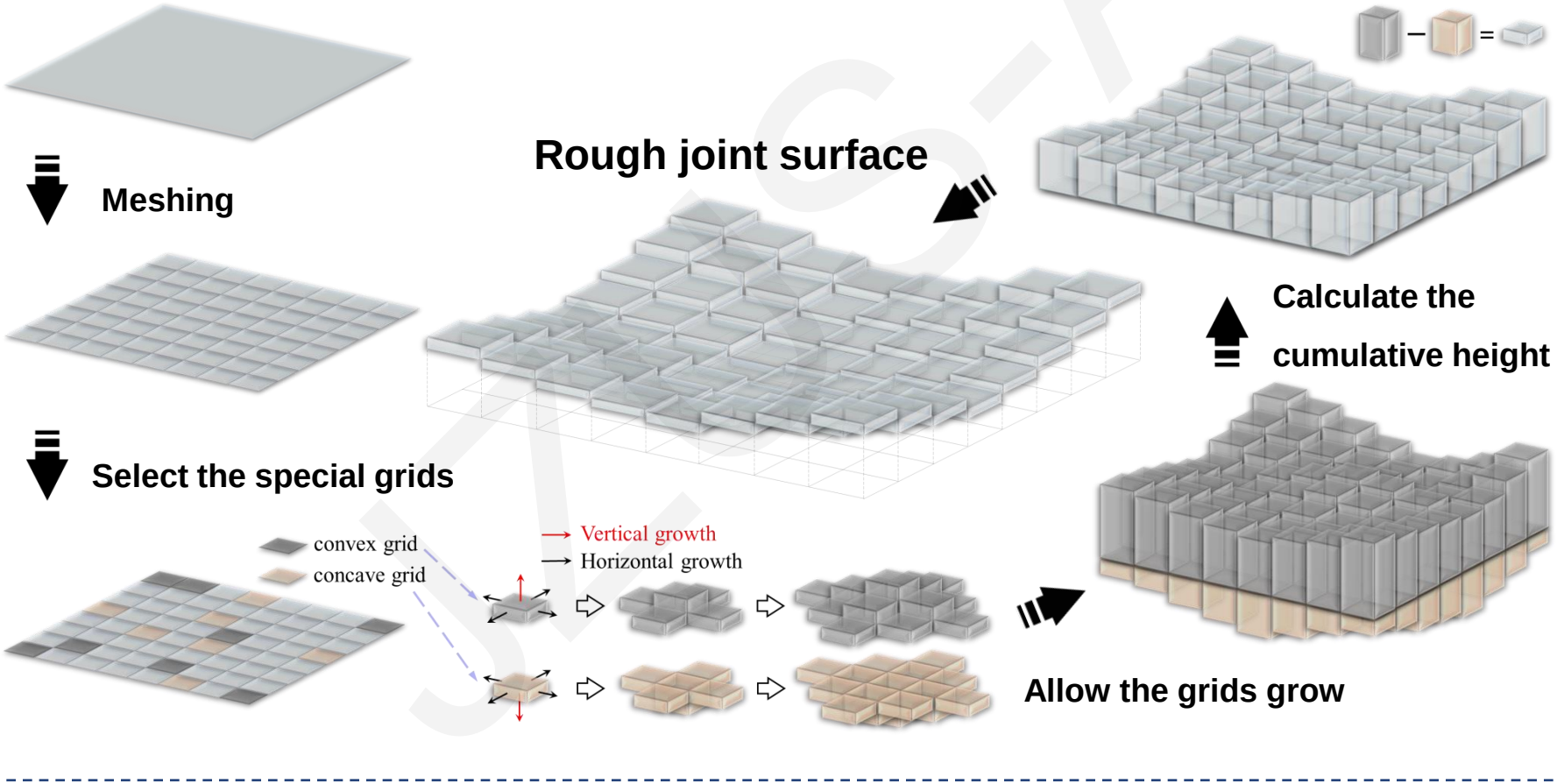


Key issue

How to reconstruct rock joints with arbitrary joint roughness and persistence?

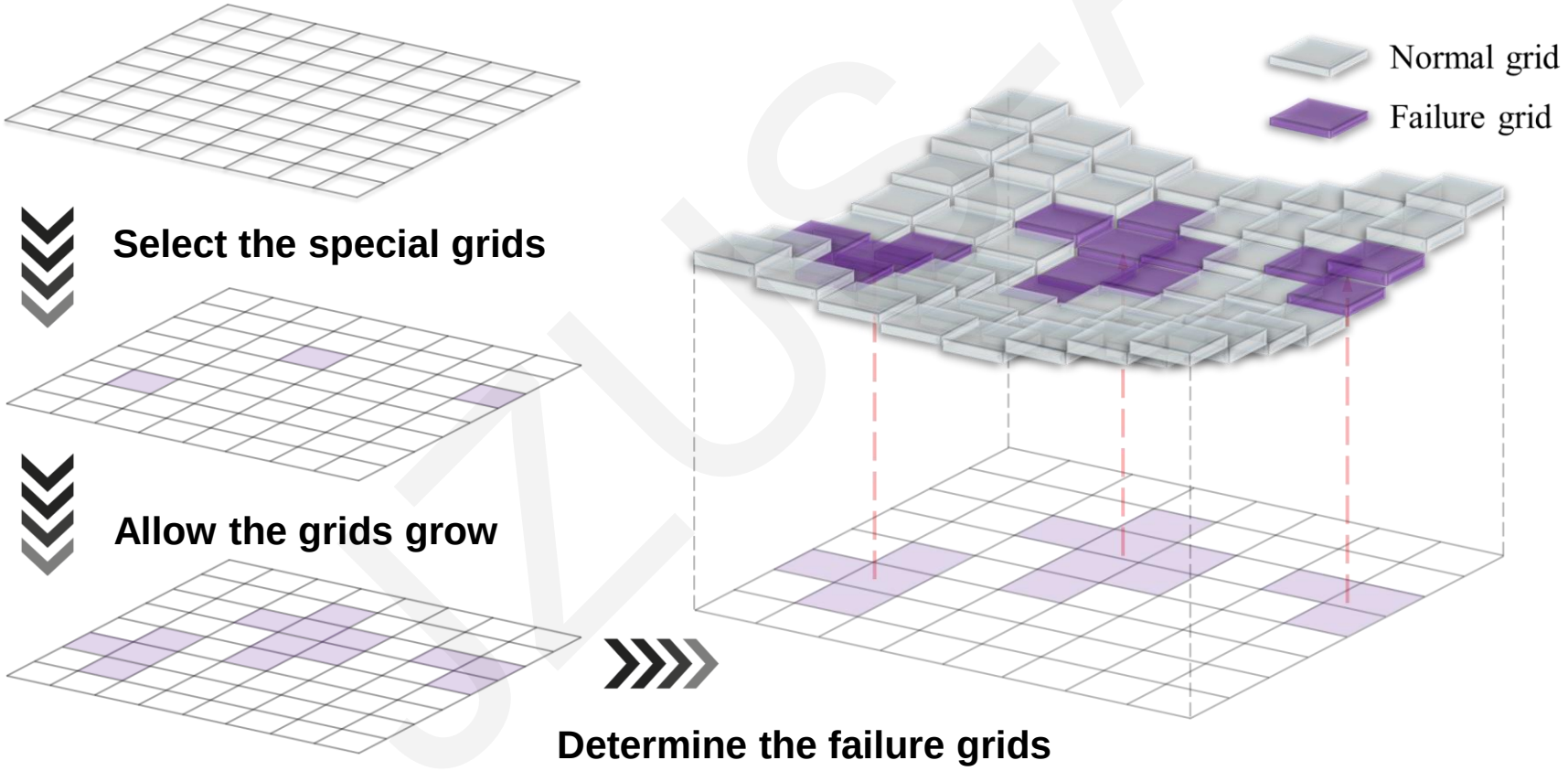
Reconstruction of Rock Joints

Method for controlling the joint roughness of the model

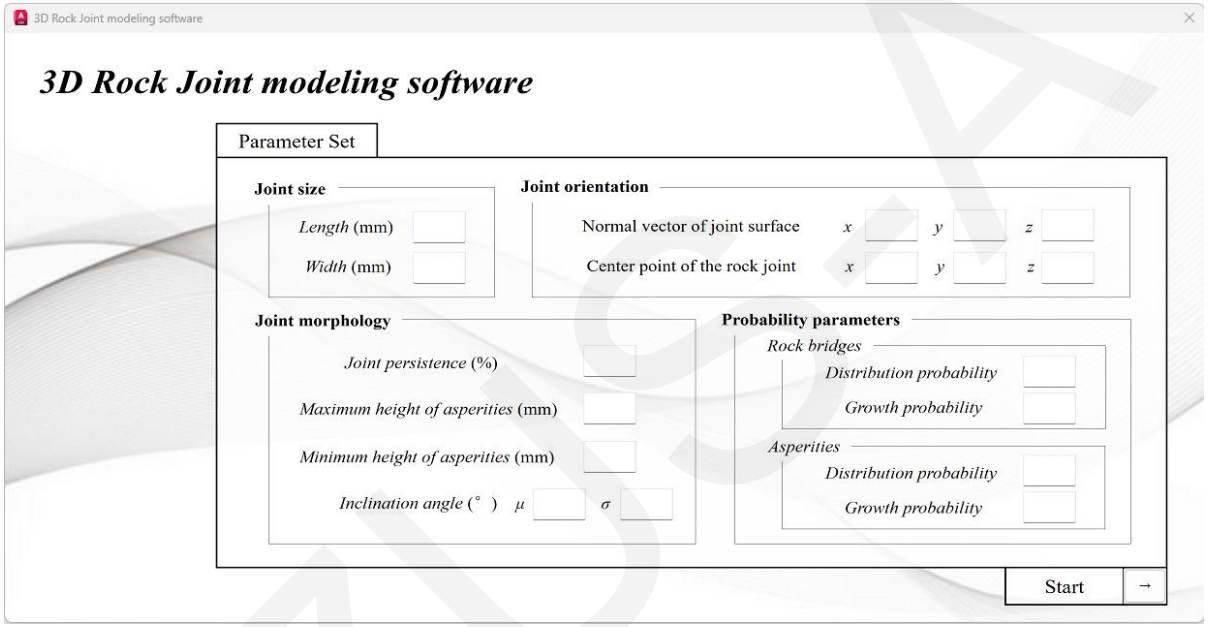


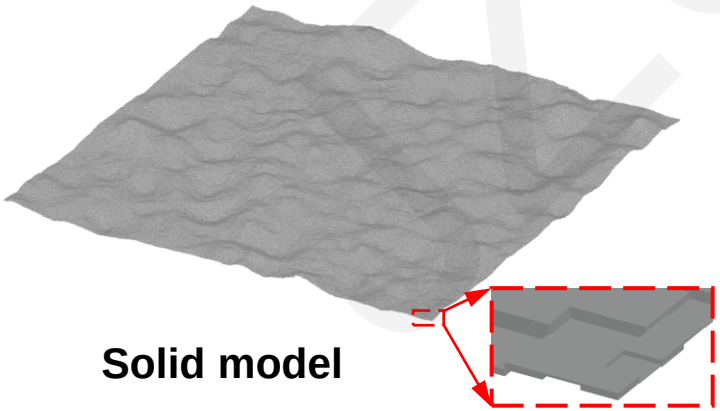
Reconstruction of Rock Joints

Method for controlling the joint persistence of the model

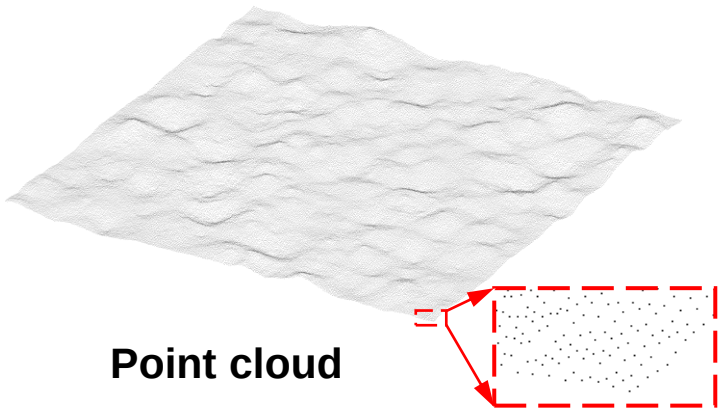


3D Rock Joint modeling software





Solid model



Point cloud

Conclusions

- The JRC of models obtained by the propsed method agrees with that of the artificially split surface. The method demonstrated high accuracy for 3D rock joint reconstruction.
- Grid-growth method can effectively control the JRC of joint models by adjusting the number, height, and slope of asperities.
- Grid-growth method can effectively control the joint persistence of joint models by adjusting the number and area of rock bridges.

JZUSA