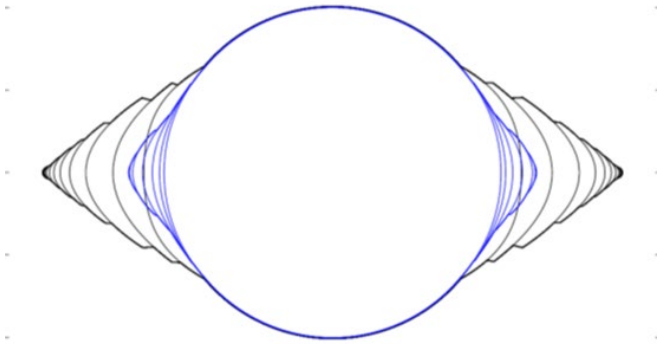
Ett nytt semi-analytiskt verktyg för spänningstolkning baserad på borrhålsutfall

A novel semi-analytical tool for stress interpretation using borehole breakouts



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Introduction

- Breakouts are observed in underground openings.
- Their shape and size is controlled by the properties of the rock and the stress state.

Main objectives

- Develop a method to evaluate the shape of breakouts, when the stress state is known
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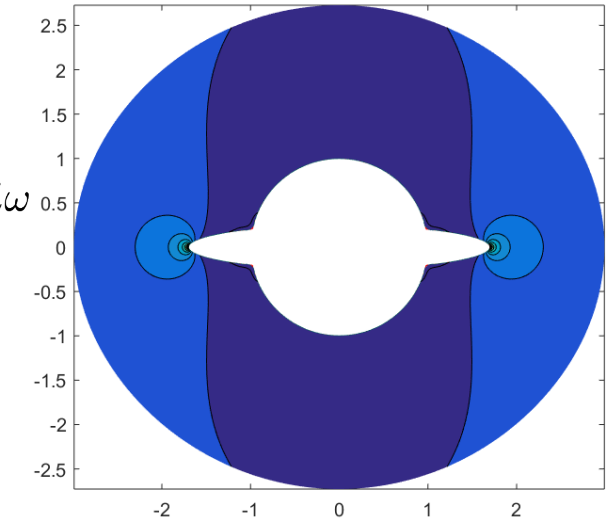
Method

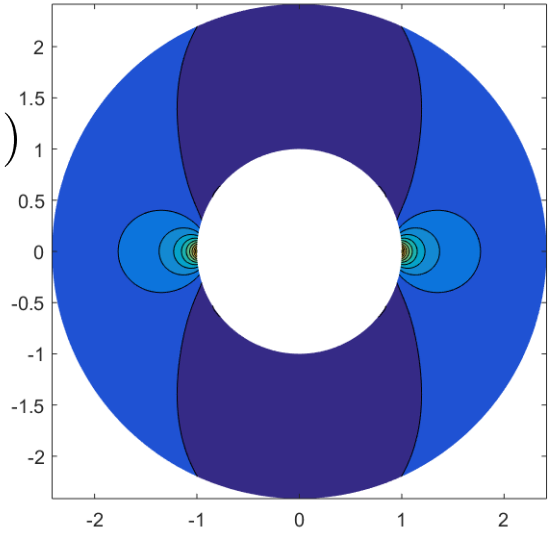
- Conformal mapping is used, the same method used for flow nets

w

$w = \rho \cdot e^{i\omega}$



$w = f(z)$



z

$z = r \cdot e^{i\theta}$

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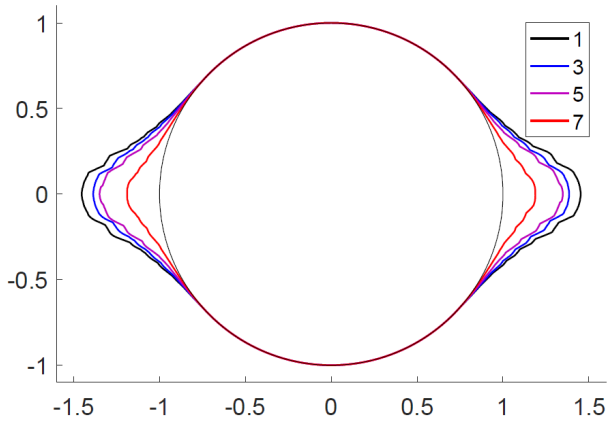
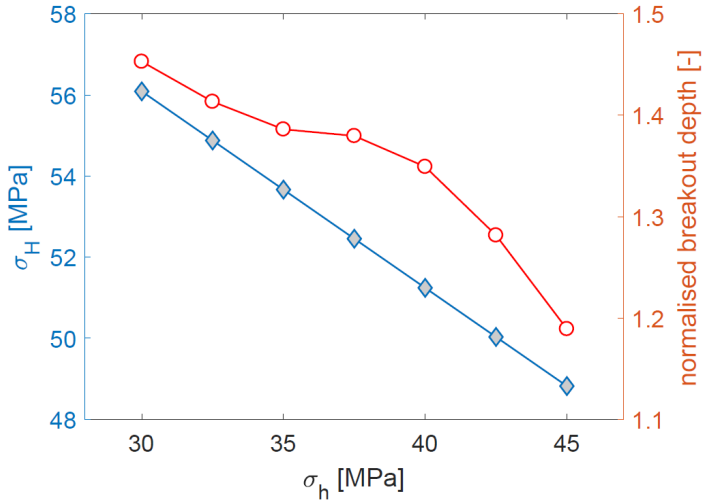
Results: Breakout prediction

- Both aperture and depth of the breakout change with the stress state





- The method works very well for shear failure, but less well for failure in compaction.

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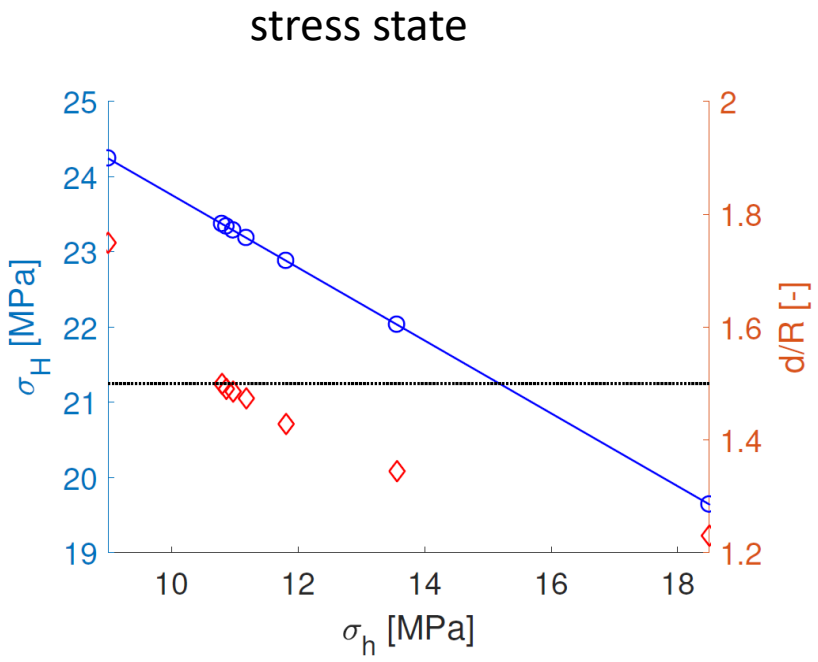
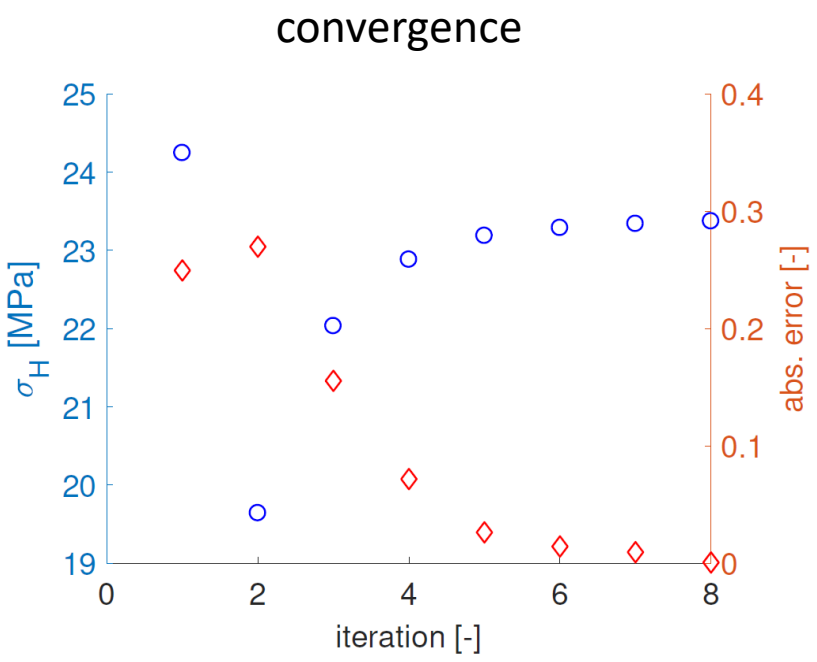
Results: Stress state prediction

- An iterative process is used to assess the stress state from the shape of the breakout.





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Conclusions

- The method is suitable for breakout shape prediction and stress state assessment in brittle rock.
- The strength parameters of the rock need to be known.
- The method is more suitable for shear failure.
- If you are interested in the method or the source code, contact us!