



Contribution ID: 408

Type: **Poster (+) Presentation**

## On the inverse problem of identifying the effective pore size distribution using non-Newtonian fluids

*Wednesday, 2 June 2021 09:00 (1 hour)*

In contrast to water (as a Newtonian fluid), the flow of some non-Newtonian fluids through porous media is related to the geometry of the pores in a way that allows to backtrack some information, such as the approximate distribution of the effective pore sizes. This can be (and has been) done in various ways, cf. the yield stress fluid porosimetry method (YSM), based on the yield stress fluid model, or more recently the model by Abou Najm and Atallah (ANA model), based on shear-thinning fluid models. The core of these methods consists of the mathematical inverse problem that needs to be solved numerically. As usual for the inverse problems, challenges may arise.

Some sets of experimental data may not reveal any information about the pore sizes. Some data may lead to numerically ill-posed problems. We do not know how the measurement error affects the inverse problem results. How to plan an optimal set of the flow experiments? After all, the two methods mentioned above focus on two distinct features of what can be the very same fluid, such as an aqueous solution of xanthan gum or guar gum, while subject to either very low (YSM), or considerably larger (ANA), shear rates. The approach which we follow attempts to cut the problem into pieces that should be first considered separately. Some of the issues can be studied by using the numerical experiments with artificial data based on the idealized capillary bundle forward problem, or on the flow through some simplified pore space geometry.

### Time Block Preference

Time Block A (09:00-12:00 CET)

### References

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