

## MOVING MATERIALS AND FLUID-STRUCTURE INTERACTION WITH UNCERTAIN DATA

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### ABSTRACT

This minisymposium focuses on the state of the art in the fields of moving materials and classical fluid-structure interactions. There may be different kind of uncertainties involved (cracks, material inhomogeneities, unknown loading, etc.) or the material may move through the system (as is often the case in the process industry).

In some industrial processes, such as paper production, the influence of the surrounding air cannot be neglected if one is to obtain accurate predictions of the system dynamics and stability. Generally speaking, difficulties may arise due to fluid-structure interaction: the flow may be turbulent, non-newtonian, etc.

One further important aspect, which is often overlooked both in applications and in research, is that in engineering and physics, model input is almost never exact. Parameters are subject to uncertainty, which may be characterized by error bounds or probability distributions. The aim of this minisymposium is to bring together experts on moving materials, fluid-structure interaction, and uncertainty, where there is classically very little overlap.

### REFERENCES

- [1] N. Banichuk, J. Jeronen, P. Neittaanmäki and T. Tuovinen, Dynamic behaviour of an axially moving plate undergoing small cylindrical deformation submerged in axially flowing ideal fluid, *J. Fluids Struct.*, Vol. 27, Issue 7, (2011).
- [2] Structural Optimization with Uncertainties. N. Banichuk and P. Neittaanmäki, *Solid mechanics and its applications*, Springer, 2009.