

## GASTVORTRAG

Die Arbeitsgruppe Numerical Analysis lädt zu folgendem Vortrag ein:

**Marco Caliarì**  
Università di Verona

### **Directional split exponential integrators with applications to Turing patterns**

Time marching schemes of exponential type received a lot of attention in the last years, thanks to the recent advances in efficiently computing actions of the exponential-like matrix functions needed by these integrators (known in the literature as  $\varphi$ -functions). In this presentation, we show how to compute those actions for matrices  $K$  that possess  $d$ -dimensional Kronecker sum structure, i.e., that are in the form  $K = K_d \oplus K_{d-1} \oplus \dots \oplus K_1$ . The technique is based on a suitable directional splitting of the exponential-like matrix functions, which allows for an efficient tensor-oriented evaluation through  $\mu$ -mode products and Tucker operators.

The implementation of such an approach is done by exploiting the high performance level 3 BLAS, which are available for any kind of modern computer architecture. The employment of the proposed technique allows for the effective numerical integration of many stiff problems from the applications using directional split exponential integrators. In particular, in this talk we present the results on two- and three-dimensional semidiscretized (systems of) advection-diffusion-reaction equations, such as the DIB and the Schnakenberg models, leading to the formation of Turing patterns.

Zeit: **Dienstag, 02. Juli 2024 um 16.00 Uhr**

Ort: **Technikerstr. 13, 6. OG, SR 609**

**Gäste sind herzlich willkommen!**

*Alexander Ostermann*