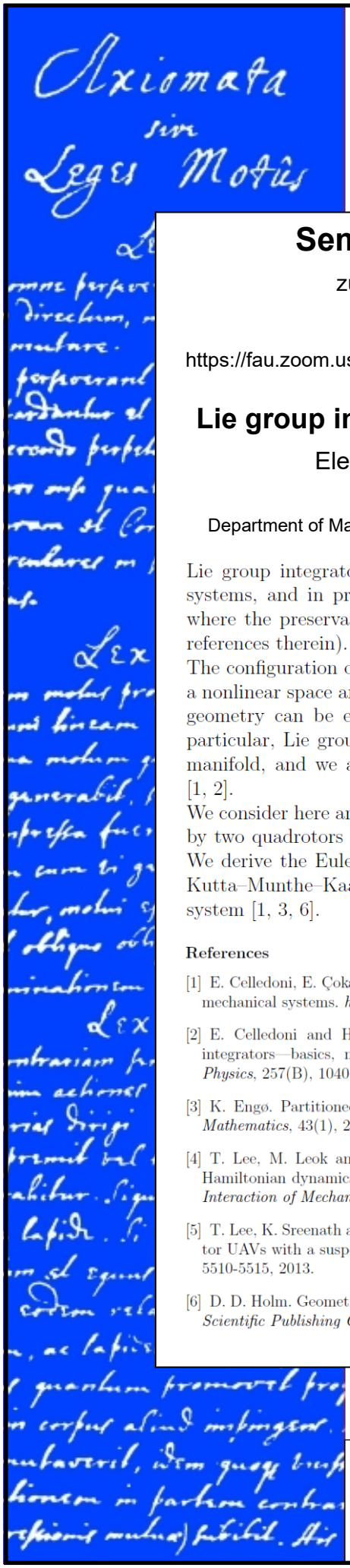

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Mittwoch, 02.06.2021, 13:00 Uhr

https://fau.zoom.us/j/62226087549?pwd=Q0ozR21zNi9JVmF5TlpkUXM2WS9qUT09

Lie group integrators approach for a multibody system

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Lie group integrators have been successfully applied for the simulation of mechanical systems, and in problems of control, bio-mechnics and other engineering applications, where the preservation of geometrical properties is of interest (see for example [1] and references therein).
The configuration of many physical problems, including multi-body dynamics, evolves in a nonlinear space and is usually described as a manifold, so that the theory of differential geometry can be exploited for the development of efficient numerical algorithms. In particular, Lie group integrators solve differential equations whose solution evolve on a manifold, and we assume that the manifold is acted upon transitively by a Lie group [1, 2].
We consider here an application for the controlled path of a mass point being transported by two quadrotors [4, 5]. The problem is modelled on $\mathbb{R}^6 \times (SO(3) \times \mathfrak{so}(3))^2 \times (TS^2)^2$. We derive the Euler-Lagrange equations of the system and show how to apply Runge–Kutta–Munthe–Kaas methods, a class of Lie group integrators, to solve this multibody system [1, 3, 6].

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