

Geometric Integration and Lie group methods,  
THREAD  
Network-wide training event 6

February 9, 2021

**SIXTH EXERCISE.** The last one.

**Problem 1.** The first problem is to finish Exercise 5 from yesterday.

**Problem 2.** Implement the RKMK method of Exercise 4 on the Heavy Top problem formulated in Exercise 5 (Problem 6). Write functions which implement all the building blocks, such as the exponential map, the commutator and the left coadjoint action. There is a known Rodrigues type formula for the  $\text{dexp}_u^{-1}(v)$  that you will find on the webpage in Matlab and Python (numpy). Put it all together and compare with a reference solution with a classical solver with very small tolerance.