

Assignments for Meeting on Mar. 9, 2021 (1/2)

- ▶ Read Chapter 14.7 in LaValle, S. M., *Planning Algorithms*, Cambridge University Press, Cambridge, UK, 2006.
- ▶ Read the paper Limebeer, D. J., & Rao, A. V., "Faster, higher, and greener: Vehicular optimal control", *IEEE Control Systems Magazine*, 35(2), 36–56, 2015. DOI: <https://doi.org/10.1109/MCS.2014.2384951>.
- ▶ Read the paper Bergman, K., Ljungqvist, O., & Axehill, D., "Improved path planning by tightly combining lattice-based path planning and optimal control", *IEEE Transactions on Intelligent Vehicles*, 2020. DOI: <https://doi.org/10.1109/TIV.2020.2991951>

Assignments for Meeting on Mar. 9, 2021 (2/2)

- ▶ Install the CasADi tool for nonlinear optimization (<https://web.casadi.org/get/>). Get acquainted with the software by studying some of the examples from the example pack available on the download page (see in particular the `opti` interface).
- ▶ Using the example `direct_collocation_opti` as template, compute the Dubins' path for selected initial and final states (regularization of the control inputs in the objective could also be considered). Compare the results with the Dubins' path computed by the implementation made in a previous assignment in the course.
- ▶ Extra assignment for interested/those with previous experience with CasADi: Compute optimal path/trajectory segments for a dynamic vehicle model¹.
- ▶ **Next meeting: Tuesday March 9, 2021, at 15:15 in Zoom.**
- ▶ Lecture responsibility: Julian Salt.
- ▶ The meeting during week 9 is re-scheduled to later during the spring. Please find a new schedule on the course homepage shortly.

¹See, e.g., Berntorp, K., Olofsson, B., Lundahl, K., & Nielsen, L, "Models and methodology for optimal trajectory generation in safety-critical road-vehicle manoeuvres", *Vehicle System Dynamics*, 52(10), 1304–1332, 2014. DOI: <https://doi.org/10.1080/00423114.2014.939094>.