

J. LUNZE: *Networked Control of Multi-Agent Systems: Application Studies*
Edition MoRa 2022

Figures that have been produced with MATLAB

2. Januar 2022

The following table shows figures of the supplementary booklet that have been produced with MATLAB (Version 2021a). The figure names have been derived from the name of the corresponding MATLAB script.

Figure	Caption	File name
2	Convergence of the sensor states towards the consensus value \bar{p}_y for the two communication graphs of Fig. 1 (I)	Sensornet2.eps
2	Convergence of the sensor states towards the consensus value \bar{p}_y for the two communication graphs of Fig. 1 (II)	Sensornet4.eps
2	Solution of a linear equation as a consensus problem	LinEqn1.eps
3	Solution of a linear equation with two communication structures .	LinEqn3.eps
3	Solution of a linear equation with two communication structures .	LinEqn4.eps
1	Synchronisation of three van der Pol oscillators that are coupled in a directed ring	SyncVanDerPol2.eps
1	Synchronisation of three van der Pol oscillators that are coupled in a directed ring	SyncVanDerPol3.eps
2	Synchronisation of three van der Pol oscillators with small damping factor	SyncVanDerPol9.eps
2	Synchronisation of three van der Pol oscillators with small damping factor	SyncVanDerPol10.eps
3	Observation errors of the distributed state observer (O_1 —, O_2 - - -)	NetwPendObserv1.eps
4	Observation results obtained by the distributed observer	NetwPendObserv2.eps
4	Observation results obtained by a centralised state observer	NetwPendObserv8.eps
5	Behaviour of the stabilised pendulum	NetwPendObserv3.eps
3	Behaviour of the power network with balanced areas	SyncPowerSyst1.eps
4	Behaviour of the balanced power network subject to a disturbance	SyncPowerSyst2.eps
5	Behaviour of the unbalanced power network	SyncPowerSyst3.eps
6	Disturbance behaviour of a balanced power network with renewable energy sources	SyncPowerSyst8.eps

5	Trajectories of ten undisturbed pillars with decentralised controller (top) and with networked controller (bottom) starting in the same initial position	Sprinkler2.eps
6	Positions of the pillars at time $t = 40$ s	Sprinkler3.eps
7	Step response of a single pillar; Required position $s_{\text{ref}}(t)$ (- - -) and true position $s_i(t)$ (—)	Sprinkler7.eps
8	Root locus of a single pillar with the closed-loop eigenvalues for $k = 0.24$ marked by \diamond	Sprinkler5.eps
9	Synchronisation of the undisturbed identical pillars	Sprinkler6.eps
10	Trajectories of ten undisturbed identical pillars with decentralised controller (top) and with networked controller (bottom)	Sprinkler8.eps
12	Behaviour of the disturbed irrigation system with networked controller	Sprinkler4.eps
3	Impulse response of the controlled vehicle	PlatoonApplSt1.eps
4	Behaviour of a platoon of ten vehicles	PlatoonApplSt2.eps
6	Impulse response of the model of the controlled vehicle (- - -) and experimental data (—)	PlatoonApplSt3.eps
7	Behaviour of a platoon with nine robots: Simulation results	PlatoonApplSt4.eps
7	Behaviour of a platoon with nine robots: Experimental results ...	PlatoonApplSt5.eps
8	Behaviour of the linear vehicle platoon	PlatoonNonlin2.eps
10	Braking manoeuvre with nonlinear vehicles	PlatoonNonlin3.eps
11	Normalised response of the controlled vehicle to stepwise changes of the local reference velocity $v_{si}(t)$	PlatoonNonlin5.eps
13	Platoon with CACC without transmission delay	PlatoonNonlin6.eps
13	Platoon with CACC with transmission delay $\tau = 1.5$ s	PlatoonNonlin10.eps
14	Collision avoidance test without transmission delay	PlatoonNonlin7.eps
14	Collision avoidance test with transmission delay $\tau = 0.9$ s	PlatoonNonlin11.eps
4	Friction-slip curve (left) and its approximation (4) (right)	CarBrakeManoeuvre1.eps
7	Angular velocity of the four wheels and vehicle velocity in a braking manoeuvre	CarBrakeManoeuvre10.eps
8	Slip in the braking manoeuvre of Fig. 7	CarBrakeManoeuvre9.eps
10	Angular velocity and vehicle velocity in a braking manoeuvre with decentralised controller	CarBrakeManoeuvre6.eps

10	Angular velocity and vehicle velocity in a braking manoeuvre with networked controller	CarBrakeManoeuvre8.eps
11	Slip of the wheels with different road conditions	CarBrakeManoeuvre9.eps
12	Comparison of the vehicle movement for the decentralised controller (dashed line) and the networked controller (solid line) with constant road conditions	CarBrakeManoeuvre7.eps
12	Comparison of the vehicle movement for the decentralised controller (dashed line) and the networked controller (solid line) with changing road conditions	CarBrakeManoeuvre13.eps
13	Slip of the wheels with changing road conditions	CarBrakeManoeuvre15.eps
2	Simulation result: Number of bikes stored in the docking stations in the centre of Paris between 5 a.m. ($k = 1$) and 10 p.m. ($k = 35$)	Paris3.eps
1	Tolerance band and a realisation of $S(k)$	ConvergenceDemo3.eps
2	A realisation of the random sequence $\{R(k), k \geq 0\}$	ConvergenceDemo4.eps
3	Tolerance band around the expected value	ConvergenceDemo5.eps
6	Nonnegative impulse response of the linear trucks	Trucksselforg5.eps
7	True (- - -) and estimated (—) disturbance and velocity of the first truck	Trucksselforg8.eps
8	Road profile and disturbance	Trucksselforg1.eps
9	Behaviour of the first truck for constant reference velocity $v_{\text{ref}}(t) = v_{\text{max}}$	Trucksselforg2.eps
10	Platoon behaviour with ACC (top) and with self-organised ACC (bottom)	Trucksselforg15.eps
11	Distance between the first two trucks with ACC	Trucksselforg7.eps
12	Behaviour of the truck platoon with self-organised ACC	Trucksselforg13.eps
13	Vehicle distances in the platoon with self-organised ACC	Trucksselforg14.eps
1	Disturbance behaviour of the plant (- - -) and of the continuous closed-loop system (—)	VERADemo1.eps
2	Behaviour of the event-triggered control loop	VERADemo2.eps
3	Sampled-data control loop	VERADemo3.eps
4	Behaviour of the event-triggered control loop with scaled norms .	VERADemo4.eps
5	Long-time behaviour of the event-triggered control loop	VERADemo5.eps
5	Long-time behaviour of the event-triggered control loop	VERADemo6.eps

6 Practical stability of the thermo-fluid process VERADemo7.eps