Welcome to Freiburg and to the Spring School!

We will share the next 8 days together in lectures, computer exercises, and social activities, with 80 participants from 23 countries. Our aim is not only to study Model Predictive Control (MPC) theory, but also to learn how to practically formulate and solve MPC problems. Therefore, the exercise sessions constitute an important part of the course. A dedicated supervision team with four tutors will help you do the exercises. We decided to only use the language Python with open-source tools (Numpy, CasADi, IPOPT) on your own laptops, so you can take all your computational results home after the course. The course is split into two weeks, the first of which is dedicated to numeric and to familiarizing with the computational tools on tutorial examples. In the second week, stability theory will be taught by Jim Rawlings and the tools presented in the first week will be used for the exercise sessions. The last part of the second week will be devoted to the solution of self-chosen problems in groups of 2-3 people. On Saturday, Rien Quirynen and Robin Verschueren will organize an excursion to the Black Forest for interested participants. We are looking forward to an exciting and productive week together!

Joel Andersson, Thilo Bronnenmeyer, Moritz Diehl, Greg Horn, Christine Paasch, Rien Quirynen, Jim Rawlings, and Mario Zanon

Public Transportation

Public transportation in Freiburg is all run by VAG (Freiburger Verkehrs AG). The tram, bus, and subway system all have the same tickets. A one-way ticket within the city costs 2,20 €. A cheaper option if you are planning on taking multiple trips is to buy 2x4-FahrtenKarte. This costs 15,90 € and gives you 2 tickets with 4 rides possible on each. You must punch the Fahrtenkarte in the machine once you board the vehicle. Transfers are allowed on the same ticket within a one hour period. Tickets can be bought on buses, or at ticket machines around the city.

Internet

You can access the internet via eduroam or ask us for temporary login details. (For the second option you need to download a VPN from following website: https://www.rz.uni-freiburg.de/services/netztel/wlan-vpn/vpn-clients?set_language=en)

Eating out

During the course most of us have lunch at the university cafeteria Mensa Rempartstraße (Rempartstraße 18, 79098 Freiburg). Here you can obtain a Mensa Card for a deposit of 7 Euros. You can top up this card with cash and use it to pay for your meal. At the end of your stay you can return the card to receive your deposit back as well as any rest amount of money that is still on your card.

Contact information

Should you encounter any problems please feel free to contact Thilo (+49 17670522554) or Mario (+49 15756296036)

	TEMPO Spring School on Theory and Numerics of Nonlinear Model Predictive Control, 1st Week from March 25-27, 2015 (led by Moritz Diehl)					
	Monday	Tuesday	Wednesday, 25.3.2015	Thursday, 26.3.2015	Friday, 27.3.2015	Saturday	Sunday, 29.3.2015
08:30			Registration Prometheus Hall, 1st floor, KG I	2. Registration Prometheus Hall, 1st floor, KG I			
09:00			Python course	Introduction to Optimization	Nonlinear Programming and Convex Optimization		
10:30			Break	Break	Break		Sunday Hike (10:00-17:00)
11:00			Python course	CasADi Introduction and Nonlinear Optimization Exercise	Gauss-Newton Exercise		
12:00			Lunch	Lunch	Lunch		
13:00			Python course	Optimal Control Overview	Real-Time Optimization		
14:30			Break	Break	Break		
15:00			Python course	Direct Multiple Shooting Exercise	Real-Time Optimization Exercise		
16:00			Break	Break	Break		
16:30			Python course	Dynamic System Models and Numerical Integration	ACADO Code Generation (Robin and Rien)		
18:00			End	End	End		
				Welcome Reception* (18:00-19:00)			

*Location: Haus zur Lieben Hand, Großer Saal, 1st floor – Löwenstr. 16, 79098 Freiburg

	Monday, 30.3.2015	Tuesday, 31.3.2015	Wednesday, 1.4.2015	Thursday, 2.4.2015	Friday	Saturday	Sunday
	TEMPO Spring School on Theory and Numerics of Nonlinear Model Predictive Control, 2nd Week from March 30 to April 2, 2015 (led by Jim Rawlings)						
09:00	Introductory Review: Linear Regulation and State Estimation (LQR and LQE)	Nonlinear Model Predictive Control - Regulation	Exam	Project Presentations			
10:30	Break	Break	Break	Break			
11:00	Exercise: LQR and LQE	Exercises	Project Work	Project Presentations			
12:00	Lunch	Lunch	Lunch	Lunch			
13:00	Tracking, Disturbances and Zero -Offset	Nonlinear Moving Horizon Estimation	Project Work	Project Presentations			
14:30	Break	Break	Break	Break			
15:00	Exercise	Exercises	Nonlinear MPC Applications (Thomas Besselmann, ABB)	Closing Session and Handout of Certificates			
16:00	Break	Break	Break	End at 16:00			
16:30	Review and Exercises	Review and Exercises	Project Work				
18:00	End	End	End				
	Spring School Dinner** (18:30-22:00)						

** Location: Peterhofkeller, Niemensstr. 10, 79098 Freiburg