

# Nonlinear Model Predictive Control for Walking Control on Humanoid Robots

M. Kudruss<sup>1</sup>, C. Kirches<sup>1</sup>, and K. Mombaur<sup>1</sup>

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**Abstract:** In the KoroBot project we investigate the core principles behind human walking motions and how methods of optimal control can be used to allow current humanoid robots to perform walking motions in the best and most human-like way. Applying optimization and nonlinear model predictive control to generate walking motions for humanoids modeled as systems of connected rigid bodies show that current state-of-the-art methods are not suitable for these problems. The intrinsic instability of bipedal locomotion needs fast and efficient control methods and the treatment of hybrid multi-body dynamics with implicit state dependent discontinuities needs for dedicated methods for optimal control.

In this talk, we present our first results of NMPC for hybrid dynamical system with discontinuities for an extended compass walker model in 2D.

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<sup>1</sup> Interdisciplinary Center for Scientific Computing (IWR), Heidelberg University  
Im Neuenheimer Feld 368, 69120 Heidelberg, GERMANY  
{*manuel.kudruss* | *christian.kirches* | *katja.mombaur*}@iwr.uni-heidelberg.de