

# Parametrizing Motion Controllers of Humanoid Robots by Evolution

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**Abstract:** Autonomous mobile robots are devices that operate within a highly indeterminate environment, the real world. Even worse, robots are physical devices that are part of the real world and hence are inherently nondeterministic by construction w.r.t. mechanical precision and sensor noise. In consequence, robotic control software has to cope with discrepancies between a robot's specification and its de-facto physical properties as achieved in production. Finding feasible parameters for robust motion controllers is a time consuming and cumbersome work. This paper contributes by demonstrating how to utilize an evolutionary process, a genetic algorithm, to automatically find terrain specific optimized parameter sets for off-the-shelf motion controllers of humanoid robots. Evolution is performed within a physical accurate simulation in order to speed up and automate the process of parameter acquisition, while results are devolved to the real devices that benefit noticeably.