

Second Order Sufficient Conditions Under Weak Assumptions for State Constrained Optimal Control Problems

K. Malanowski¹, H. Maurer², and S. Pickenhain³

Abstract: Second order sufficient optimality conditions (SSC) are derived, for an optimal control problem subject to mixed control-state and pure state constraints of order one. The proof is based on a Hamilton-Jacobi inequality and it exploits regularity of the control function, as well as the associated Lagrange multipliers. The obtained (SSC) involve Legendre-Clebsch conditions and solvability of an auxiliary Riccati equation. They are weakened by taking into account the strongly active constraints.

¹ Systems Research Institute, Polish Academy of Sciences
ul. Newelska 6, 01-447 Warszawa, Poland

² Institut für Numerische und Instrumentelle Mathematik
Westfälische Wilhelmsuniversität Münster
Einsteinstrasse 62, 48149 Münster, Germany.

³ Brandenburg Technical University of Cottbus
Institut für Mathematik, Karl-Marx-Str. 17, 03046 Cottbus, Germany.