

Preface

One of the motivations behind this book was to collect together the many results of the Oxford University predictive control group. For this reason we have, rather unashamedly, included a number of ideas that were developed at Oxford and in this sense some of the discussions in the book are included as background material that some readers may wish to skip on an initial reading. Elsewhere, however, the preference for our own methodology is quite deliberate on account of the distinctive nature of some of the Oxford results. Thus, for example, in Stochastic MPC our attention is focussed on algorithms with guaranteed control theoretic properties, including that of recurrent feasibility. On account of this, contrary to common practice, we often eschew the normal distribution, which despite its mathematical convenience neither lends itself to the proof of stability and feasibility, nor does it allow accurate representations of model and measurement uncertainties, as these rarely assume arbitrarily large values. On the other hand, we have clearly attempted to incorporate all the major developments in the field, some of which are rather recent and as yet may not be widely known. We apologise to colleagues whose work did not get a mention in our account of the development of MPC; mostly this is due to fact that we had to be selective of our material so as to give a fuller description over a narrower range of concepts and techniques.

Over the past few decades the state of the art in MPC has come closer to the optimum trade-off between computation and performance. But it is still nowhere near close enough for many control problems. In this respect the field is wide open for researchers to come up with fresh ideas that will help bridge the gap between ideal performance and what is achievable in practice.

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Basil Kouvaritakis
Mark Cannon



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Kouvaritakis, B.; Cannon, M.

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