Acknowledgments

First of all, I would like to express my enormous gratitude to my supervisor Prof. dr. Arjan van der Schaft. Without his great support and daily supervision this project would definitely not have been possible. I am grateful to Arjan for offering me this project, for sharing his immense knowledge, vision and intuition, for his excellent supervision and for the increased levels of motivation and enthusiasm I was getting during each and every discussion with him. Thank you for all those unscheduled five-minute meetings which sometimes stretched for hours. Finally, I would like to thank Arjan for giving me an excellent opportunity to attend many conferences, workshops and DISC events.

I would like to thank the members of my Ph.D. reading committee Prof. dr. A.C. Antoulas, Prof. dr. S. Gugercin and Prof. dr. H. L. Trentelman, as well as dr. T. Stykel, for sparing their precious time in reading and suggesting valuable comments on my thesis. The comments have significantly improved the presentation of this work.

I would also like to thank Prof. dr. J.C. Willems, Prof. dr. A. Astolfi, Prof. dr. W.H.A. Schilders, Prof. dr. V. Mehrmann, Prof. dr. E. Verriest, Prof. dr. Z. Bai, as well as dr. A. Jokic, dr. ing. R. Eid, dr. E.J.W. ter Maten, dr. J. Rommes and dr. S. Wattamar, for several fruitful discussions during conferences and workshops. I would like to acknowledge all the new colleagues I had met during those events. Thanks to all the DISC fellows.

I am grateful to Prof. dr. S. Gugercin, Prof. dr. C.A. Beattie and dr. S. Weiland for the fruitful collaborations which opened new horizons in the field of model order reduction.

I would like to express my gratitude to Prof. dr. R.F. Curtain, Prof. dr. J.M.A. Scherpen, Prof. dr. J. Top, Prof. dr. M. van der Put, Prof. dr. H.W. Broer, dr. K. Camlibel, dr. M. Dür, B. Jayawardhana, dr. ir. F.W. Wubs, dr. M. Cao, as well as to the Ph.D. students and colleagues Shaik, Harsh, Diego, Minh, Amit, Sasanka, Alef, Olga, Fai Lung Tsang, Cecile, Stephen, Gert, Giulio, Victor, Alex, Mark, Ricardo, Irene, Tudor, Thomas, Danny, Tano, Bas, Younas, Peter, Eshee, Desiree, Ineke and many more, for valuable advices, lively discussions, interesting lunches and all the events, colloquia and seminars which took place at the Department of Mathematics and the University of Groningen. Thank you as well for wonderful time we had at workshops and conferences.

My special thanks to the research groups of dr. S. Weiland and Prof. dr. ing. B. Lohmann for giving me an opportunity for scientific visits and for the
I would like to acknowledge Prof. dr. H. Zwart for helping me with the application procedures and directing myself to Prof. dr. Arjan van der Schaft just before the start of the project.

I would like to thank Prof. dr. A.L. Yampolsky and O. Chuprinin for several valuable advices before the start and during my Ph.D. training.

Aneesh and Florian, you have been great officemates and friends. All those fascinating discussions, fun and enormous amount of consumed tea made my work even more enjoyable. How can I forget that wonderful time we had together during squash, table tennis, poker, bowling games. Aneesh, the revanche in table tennis is still waiting for you. Florian, tell me how I can win a game of squash or bowling with you? Those experiences with you guys in Italy, Germany, France, Austria, The United States, Spain and Hungary are always in my memory.

I would like to thank Sijbo, Florian and Thijs for their immense help in managing official letters in Dutch, especially those from the Dutch tax authorities. Thijs and Florian, thank you for supporting me at my defense as Paranymphs.

Thijs, Florian, Alessio, Diego, Aneesh, Sijbo, Kostya and others. It has been great to spend all the Champions League evenings together! What are your predictions? I would say this year Barcelona will keep the title! After all those poker tables I cannot wait for another session to win my money back! Thijs, personally, a chess revanche has to be scheduled pretty soon! And no spicy food this time! I would like to keep my concentration!

During these years I have also met a lot of wonderful people from outside the Department of Mathematics and the University Groningen. Michael W., Michael K., Rafał, Kamila, Marcin, Maciek, Monica, Yola, Diana, José, Tiago, Vika, Terezka, Jitka, Iskren, Lenka, Deepa, Anjli, Aree, Alessio, Daniele, Fabrizio, Filippo, Tatyana, Roberto, Regis, Sergey, Andrea, Gaston, Sebastiano, Julio, Alessandro. . . Thank you all for the offered friendship and the wonderful activities we had together, including those in Belgium, Germany, Portugal, Spain, Czech Republic, Poland, Ukraine, France, Hungary, China, Austria, Italy, The United States, and of course, Caribbean Islands.

Special thanks to Adriana, Anton and Kostya for the kind offering of those great apartments in Groningen. Thanks to the whole family of Albertineros and the Mamio team.

Last but not the least, I would like to express my gratitude towards my father Valentyn, my mother Oksana, my sister Tatyana, my brother-in-law Vladimir, my little niece Taisia and the rest of my family, who were always there with their support, inspiration, care and understanding.

For those who cannot find their names in this page, you are in my heart.