



Department of Mathematics

# Numerical Mathematics and Applied Analysis Group Seminar (NMAA)

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## Lecture Series –

### A numerical linear algebra framework for solving problems with multivariate polynomials

#### Lecture 1: Basic operations

**Dr. Kim Batselier**

Department of Electrical and Electronic Engineering, HKU

on Thursday, February 13, 2014 at 2:30pm  
in Room 309, Run Run Shaw Building, HKU

#### Abstract

Multivariate polynomials are ubiquitous in engineering. Not only are they a natural modelling tool, many parameter estimation problems can also be written as finding the roots of a multivariate polynomial system. Most computational methods in this setting are symbolical and are described in a branch of mathematics called algebraic geometry. This has somehow prevented the growth of a numerical approach to these problems. In this 3-part series of seminars we will bridge the gap to numerical methods by introducing a numerical linear algebra framework that allows us to solve problems with multivariate polynomials. The two main tools in this polynomial numerical linear algebra (PNLA) framework are the singular value decomposition (SVD) and rank-revealing QR decomposition. We start off the series with describing the three basic operations of addition, multiplication and division in the PNLA framework.

#### *Biography:*

*Kim Batselier received his Master of Science degree in Electrical Engineering from the KU Leuven, Belgium in 2005. He then worked for BIORICS on the development of real-time monitoring algorithms that use system identification techniques to monitor professional football players during their training. This was in collaboration with Milan Lab, the research centre of AC Milan. In 2013 he obtained a Ph.D. degree at the STADIUS research unit of the Department of Electrical Engineering of the KU Leuven, under the supervision of Prof. Bart De Moor. Currently, he is a post-doctoral research fellow at The University of Hong Kong. His main research interests are numerical linear and polynomial algebra, systems theory, scientific computing and signal processing.*

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**All are welcome**

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