# The finite section method for infinite Vandermonde matrices

André C.M. Ran

The finite section method for infinite Vandermonde matrices is the focus of this talk. More precisely, we shall consider an infinite system of equations of the form $Ax = d$, where

$$A = \begin{pmatrix} 1 & 1 & 1 & \dots \\ a_0 & a_1 & a_2 & \dots \\ a_0^2 & a_1^2 & a_2^2 & \dots \\ \vdots & \vdots & \vdots & \end{pmatrix}, \qquad d = \begin{pmatrix} d_0 \\ d_1 \\ d_2 \\ \vdots \end{pmatrix}.$$

Assuming that all $a_j$'s are different, the $n \times n$ finite sections $A_n$ of the matrix $A$ will all be invertible. Hence for each $n$ there is a unique solution of $A_n x_n = P_n d$, where $P_n$ is the projection onto the first $n$ coordinates. Embedding $x_n$ into an infinite vector by continuing with zeros, we can study the question whether in some topology these vectors converge to a solution of $Ax = d$.

It will be shown that for a large class of infinite Vandermonde matrices the finite section method indeed converges in $l_1$ sense if the right hand side $d$ of the equation is in a suitably weighted $l_1(\alpha)$ space. More explicit results are obtained for a wide class of examples.

This is joint work with András Serény.