



universität  
wien

Fakultät für Mathematik

## Mathematisches Kolloquium

Mittwoch, 13. Juni 2018

Sky Lounge

### EINLADUNG

**Arnold Neumaier**

(Universität Wien)

"The mathematics of animal breeding values"

## "The mathematics of animal breeding values"

**Abstract:** Successful animal breeding is one of the pillars of modern agriculture. In the past, the selection of animals for reproduction was done based on pedigree records over many generations, containing the genealogy of thousands or even millions of animals together with data on their economic cost and value. From these data, characteristic breeding values are derived that estimate the value of the current generation of breeding animals for generating productive offspring. This is done using mixed models, linear statistical models for estimating fixed and random effects explaining the data available by means of relations derived from Mendelian genetics. Given such a model, the best linear unbiased prediction (BLUP) of the performance indices modeled can be computed by solving a linear system of equations. In particular, this gives the desired breeding values. The parameters in these models (e.g., heritabilities) are generally unknown initially. They are estimated using a nonlinear optimization procedure called restricted maximum likelihood (REML). In the last decade, the collection of new information in the form of genetic marker data has become economically viable. This gives direct access to part of the genomic information of the animals, and hence an improved means of estimating the properties of potential offspring. The present lecture discusses mixed model equations, the efficient implementation of the REML procedure, and recent techniques for incorporating the additional genomic information into the models. (This is joint work with Prof. Eildert Groeneveld, Bundesforschungsanstalt f. Landwirtschaft, Neustadt, Germany.)

**15.45 Uhr: Kaffeejause**

**16.15 Uhr: Vortrag**

**vinum cum pane im Anschluss**

Christian Krattenthaler