

*Workshop on  
Computational Commutative Algebra, July 2-7, 2011, IPM, Tehran, Iran*

## Generic Initial Ideals

**Jürgen Herzog**

*University of Duisburg-Essen  
Germany*

These lectures are designed to be an introduction to the theory of generic initial ideals. We will discuss some homological and combinatorial aspects of generic initial ideal. In the series of the five lectures the following topics will be treated:

- Lecture 1:** Zariski open sets and generic linear automorphisms. Definition of generic initial ideals. Existence
- Lecture 2:** The theorem of Galligo and Bayer-Stillman. Strongly stable and Borel fixed ideals. Ideals of Borel type
- Lecture 3:** Almost regular sequences. Generic annihilator numbers. Extremal Betti numbers
- Lecture 4:** The Eliahou-Kervaire formula. Componentwise linear ideals. Ideals with stable Betti numbers
- Lecture 5:** Shifting operations. Kalais squarefree operator. Symmetric algebraic shifting

The lectures follow closely the presentation in my book with Hibi “Monomial Ideals” Springer, GTM 260. Thus this book may serve as lecture notes for this course.