Fachbereich Mathematik
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Winter Semester 2007/08, Set 10

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Computer Algebra

Due date: Tuesday, 22/01/2008, 10h00

Exercise 37: Develop and implement in SINGULAR an algorithm `MaxIndSet` which computes a maximal independent set of an ideal I in a polynomial ring.

Exercise 38: Deduce from Exercise 32 an algorithm `ZDRadical` which computes the radical of a zero-dimensional ideal in $K[\underline{x}]$ with $\mathrm{char}(K) = 0$. You may assume that we can calculate the squarefree part of a univariate polynomial (e. g. by factorizing it).

Exercise 39: Deduce from Exercise 38 an algorithm `Radical` for an arbitrary ideal $I \trianglelefteq K[\underline{x}]$ where $\mathrm{char}(K) = 0$ via reduction to dimension zero as for the primary decomposition.

Exercise 40:

a. Compute a minimal primary decomposition of $\langle x^2 + 1, y^2 + 1\rangle$ in $\mathbb{Q}[x, y]$ using ZDPD-Algorithm.

b. Compute a minimal primary decomposition of $\langle xz, yz\rangle$ in $\mathbb{Q}[x, y, z]$ using the PD-Algorithm.