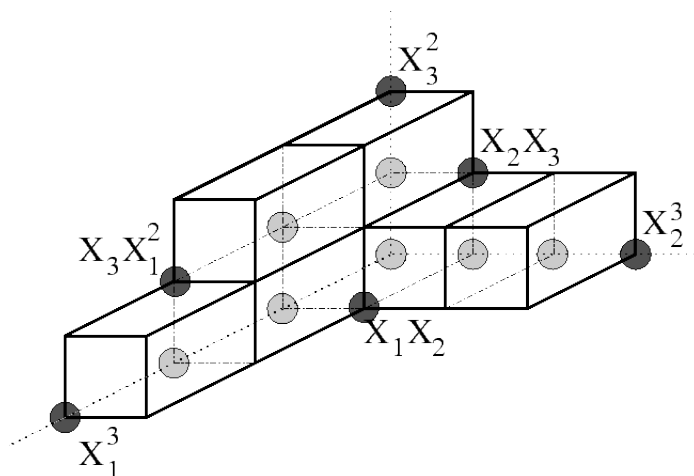


MATH3353
COMPUTATIONAL ALGEBRA

Course Outline. Since the 1960s, a new field of mathematics has been steadily growing in significance. Broadly describable as computational algebra, this field grew out of algorithms for computing Gröbner bases. Some notable successes have stimulated a wide interest in the area, from disciplines such as engineering and robotics through to algebraic geometry and cryptography.

Topics in abstract algebra will be approached from the perspective of what can be computed using such software packages as *Maple*, *Macaulay 2*, and *GAP*. The topics covered will be selected from Gröbner bases, resultants, solving polynomial equations, invariant theory of finite groups, and the exact solution of differential equations. The course work will include a mixture of problem sets emphasising theory and practical lab assignments.



An illustration of a Gröbner basis calculation.

Prerequisites. One of Math1013 or Math1063, and one of Math1503 or Math2213.

Course Text.

Cox, Little, and O'Shea, *Ideals, Varieties, and Algorithms* (Second Edition), Undergraduate Texts in Mathematics, Springer-Verlag, New York, 1997.