

## Mathematics & Computer Science

### NUMBER THEORY AND COMBINATORICS SEMINAR



Wednesday – 2 November 2011

E575 – 12:00 to 12:50 p.m.

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Title: A Theorem of Frobenius

Abstract:

Consider the irreducible polynomial  $f(x)=x^3-x-1$ . Let  $p$  be a prime and consider this as a polynomial over the finite field of  $p$  elements. Over this field the polynomial is either irreducible, splits into three linear factors, or splits into a linear factor and a quadratic factor. Frobenius proved a theorem which asserts that these 3 cases occur with frequencies:  $1/3$ ,  $1/6$ , and  $1/2$ . Why do these fractions occur? The answer is related to the fact that the Galois group of  $f$  is the symmetric group of 3 letters. Moreover, he considered how an irreducible polynomial factors when reduced modulo  $p$ . In this talk I will explain Frobenius' theorem. This seminar will be accessible to undergraduate students who have taken Math 3400 (Group and Rings).

EVERYONE IS WELCOME!

Visit the seminar page at <http://www.cs.uleth.ca/~nathanng/ntcoseminar.html>

