

COLLOQUIUM
UNIVERSITY OF PITTSBURGH
FRIDAY, NOVEMBER 6, 2009

704 THACKERAY HALL

4:00 P.M.

PROFESSOR ALEXANDER BUIUM

DEPARTMENT OF MATHEMATICS

UNIVERSITY OF NEW MEXICO

ARITHMETIC DIFFERENTIAL EQUATIONS

ABSTRACT: One can develop an arithmetic analogue of the theory of (ordinary/partial) differential equations. In the (ordinary) arithmetic theory the “independent variable” t is replaced by a fixed prime integer p .

Smooth real functions, $x(t)$, are replaced by integer numbers, a , or, more generally, by integers in various (completions of) number fields. The derivative operator on functions $x \rightarrow dx/dt$ is replaced by a “Fermat quotient operator” which, on integer numbers, acts as $a \rightarrow (a - a^p)/p$. One can apply this theory to prove results in diophantine geometry.

Refreshments served at 3:30 p.m.
in the Math Dept. COMMON ROOM, Thackeray 705