

**Extra Credit Problem**  
(Due in class on Monday 10/30.)  
Math 455

Problem from this years “UT Math Contest” (Fermat II) for high school students.

*You are not allowed to talk to **anyone** about this problem!* (At least until it is due.)

**Problem:** Let  $a, b, c \in \{1, 2, \dots, 2005\}$  and

$$f(X) \stackrel{\text{def}}{=} aX^{101} + bX^{100} + c.$$

Prove that if  $f(2006)$  is prime, then  $f(X)$  has no integral root, i.e., there is no  $n \in \mathbb{Z}$  such that

$$a n^{101} + b n^{100} + c = 0.$$