Exam 1
Algebraic Coding Theory
Math 525
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Problem 4: Let C be the code:

$$C = \{000100, 101010, 001001\}$$

1. Determine the error patterns that Theorem 1.12.9 guarantees that C corrects.

   Notice the minimum distance, $d = 3$. By Theorem 1.12.9, "A code of distance d will correct all error patterns of weight $\leq \lfloor \frac{d-1}{2} \rfloor$". So C will correct all error patterns of weights ≤ 1. That is:

   $$e = \{000000, 100000, 010000, 001000, 000100, 000010, 000001\}$$

2. Use the technique described in Example 1.12.11 to decide whether or not C corrects the error pattern 110000.

   Notice the IMLD table:

w	$000100 + w$	$101010 + w$	$001001 + w$	v
110100	11000^*	011110	111101	000100
011010	011110	110000^*	010011	101010
111001	111101	010011	11000^*	001001

   So C does in fact correct $u = 110000$