Example 3:
\( L = \{ w \mid w \text{ has an equal number of } a's, b's, \text{ and } c's \} \)

E.g.: \( abaccc \) \( b \in L \)

**Step 1:** \( S = a^p b^p c^p \) \( \text{IS} \leq 3p > p \) \( S \in L \)

**Step 2:**

*Case 1:* \( v \) or \( y \) contain 1 or more \( a's \)
\( v \) and \( y \) cannot contain \( c's \) since that would require \( |vxy| > p \)

*Case 2:* \( v \) or \( y \) contain 1 or more \( c's \)
\( v \) and \( y \) cannot contain \( a's \) since that would require \( |vxy| > p \)

*Case 3:* \( v \) and \( y \) contain just \( b \)

Note: \( v \) and \( y \) cannot contain all three letters as that would require \( |vxy| > p \)

**Step 3:**

*Case 1:* \( u \) \( v^2 \) \( x \) \( y^2 \) \( z \) contains more \( a's \) than \( c's \) so \( u \) \( v^2 \) \( x \) \( y^2 \) \( z \) \( \notin L \)

*Case 2:* \( u \) \( v^2 \) \( x \) \( y^2 \) \( z \) contains \( p \) \( c's \) and more than \( p \) number of \( a's \) so \( u \) \( v^2 \) \( x \) \( y^2 \) \( z \) \( \notin L \)

*Case 3:* \( u \) \( v^3 \) \( x \) \( y^2 \) \( z \) contains \( p \) number of \( a's \) and \( c's \) but the number of \( b's \) is larger than \( p \) so \( u \) \( v^3 \) \( x \) \( y^2 \) \( z \) \( \notin L \)