(3)

Let $\Sigma = \{0, 1\}$ and L be the language

$$L = w | \text{ the number of occurences of } 01 \text{ in } w \text{ is equal to the number of occurences of } 10$$

For example, the word 010 is in L because it has one occurences of 01 and one of 10. The word 01101 is not in L because it has 2 occurences of 01 but only one of 10. Does there exist a regular expression r such that $L = L(r)$? If yes, find one. If not, explain why not.

$r = (10(0^*)1|01(1^*)0)^*$