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1 Exercise

Suppose L is regular. Then Pumping Lemma applies. Let n be the pumping constant. Choose w be any string in L with n left parentheses and n right parentheses. By Pumping Lemma, w can be factored into xyz such that $|xy| \leq n$, $|y| > 0$ and, for all $i > 0$ $xy^iz \in L$. Since $|xy| \leq n$ and $|y| > 0$, the string y consists only of left parentheses and has at least one left parentheses. Consider $i = 2$, then $xy^2z = xyyz \notin L$. Thus the string has to be hold more left parentheses than right parentheses. As a result, it's unbalanced, then we have obtained contradiction of the assumed regularity of L. Hence, L is not regular.