

Practice problems in PCP

1. Let $\Sigma \geq 2$ and $\underline{x} = (x_1, x_2, \dots, x_n)$ and $\underline{y} = (y_1, y_2, \dots, y_n)$ be two lists of non-null words. IS PCP solvable if $n = 2$?

2. Is the following problem solvable? If so give an algorithm.

Let the two lists be defined as in Problem 1. Do there exist $k, l, i_1, \dots, i_k, j_1, \dots, j_l$ such that $x_{i_1} \dots x_{i_k} = y_{j_1} \dots y_{j_l}$?

3. A CFL L is prefix free if for any $u, v \in \Sigma^*$ we have $uv \in L$ and $u \in L$ imply $v = \epsilon$. Show that it is undecidable whether or not L is prefix free. (Hint: Encode as instance of PCP).