

Problem

Show that $BPP \subseteq PSPACE$.

Step-by-step solution

Step 1 of 1

Consider M be a probabilistic TM which runs on polynomial time.

Therefore, $M \in BPP$. M can be modified so that M makes exactly n^k coin tosses in each branch of its computation, for any constant k . There are total of $2^{(n^k)}$ computation paths. Hence, problem which is determining probability that M accepts its input is reduces to counting how many branches,

B , are accepting and comparing this number with $P = \left(\frac{3}{4}\right) \cdot 2^{(n^k)}$.

If $B \geq P$, then accept; otherwise reject. Now the given deterministic task can be performed in the polynomial space by generating all possible paths sequentially following M 's program but recycling the space used by the previous path.

Hence, the problem of BPP is converted into $PSPACE$. Therefore, $BPP \subseteq PSPACE$.

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