

PS07-02

February 16, 2018

Suppose that there is a string w that passes through state q .
Let TM R decide HP and TM S decide ENTER_{TM} .
S: on input $[M, w]$:

1. Run R on $[M, w]$
2. if R rejects, reject
3. if R accepts, simulate M until Halt.
4. if M accepts, accept, rejects, reject.

If R decides ENTER_{TM} , then S decides HP, which is undecidable. Therefore, ENTER_{TM} must also be undecidable.