COMS 3003A
Addendum to HW 6

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Due 12 April, 2024

We have proven using diagonalization that the problem of deciding whether a Turing machine does not accept its own encoding is algorithmically unsolvable. Use this result and your answers to questions from HW 6 to prove that the following problems are algorithmically unsolvable:

(1) Given an encoding of a Turing machine M, decide whether M accepts $\langle M \rangle$.

(2) Given an encoding of a Turing machine M and a word w, decide whether M accepts w.

(3) Given an encoding of a Turing machine M and a word w, decide whether M halts on w.

(4) Given an encoding of a Turing machine M, decide whether M halts on the empty word.

(5) Given an encoding of a Turing machine M, decide whether M ever writes a blank symbol on its tape.

(6) Given an encoding of a Turing machine M, decide whether M ever stays in the same state in two consecutive configuration.