

Exercise 8.1

KEI PLAN WAS SIE MIT SET S MEINT...

- (a) Let M_1 be a TM that is undefined on input 0 and M_2 be another TM that is defined on input 0. Let both TM's compute an unary function over \mathbb{N} . The Rice theorem tells us that it's impossible to write a general algorithm that decides whether a given TM has a property or not except if the property is always true or false. Since M_1 and M_2 are two TM's that behave differently, the property of 0 being undefined is not always true or false and therefore the language L is undecidable.
- (b) Let M_1 be a TM that rejects every input and M_2 be another TM that accepts every input. Both TM's obviously behave differently and are therefore undecidable using the Rice theorem
- (c) L is decidable because if it halts on an even number of steps for input 0, it always halts on an even number of steps. (KEI PLAN WIESO... CHATGPT)
- (d) L is decidable because we can "simply" compute possible pairs of input and compare them with the output. (EBEFALLS CHATGPT. MACHT IRGENDWIE HALBWEGS SINN??)

Exercise 8.2

Exercise 8.3

- (a)
- (b)

Exercise 8.4

- (a)
- (b)