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**Mariya I Soskova\*** (msoskova@math.wisc.edu), Department of Mathematics, 480 Lincoln Drive, Madison, WI 53706. *Towards an algorithm for deciding the two quantifier theory of the partial order of the enumeration degrees.* Preliminary report.

The structure of the enumeration degrees  $\mathcal{D}_e$  is similar in many respects to the structure of the Turing degrees  $\mathcal{D}_T$ : both are upper semi-lattices with least element; they embed any countable partial order, thus rendering the one quantifier theory of either structure decidable; they both have undecidable full theories, in fact, the full theory of both structures is computably isomorphic to second order arithmetic. Undecidability in the Turing degrees happens at quantifier level 3. The decidability of the two quantifier theory of  $\mathcal{D}_T$ , due to Lerman and independently Shore, relies on initial segment embeddings of finite lattices. We do not yet know where decidability breaks down for  $\mathcal{D}_e$ . Moreover, among the main structural differences between  $\mathcal{D}_T$  and  $\mathcal{D}_e$  is the lack of minimal enumeration degrees, making the decision procedure for the two quantifier theory of  $\mathcal{D}_T$  not applicable for  $\mathcal{D}_e$ . We propose a different procedure and report on progress towards establishing its correctness. This is joint work (in progress) with Steffen Lempp and Theodore Slaman. (Received January 17, 2019)