ON THE ORBITS OF COMPUTABLE ENUMERABLE SETS

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Abstract. The goal of this paper is to show there is a single orbit of the c.e. sets with inclusion, $\mathcal{E}$, such that the question of membership in this orbit is $\Sigma^1_1$-complete. This result and proof have a number of nice corollaries: the Scott rank of $\mathcal{E}$ is $\omega^{CK}_1 + 1$; not all orbits are elementarily definable; there is no arithmetic description of all orbits of $\mathcal{E}$; for all finite $\alpha \geq 9$, there is a properly $\Delta^0_\alpha$ orbit (from the proof).

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