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O-minimal structures on residue fields of rings of continuous functions

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We introduce the first order theory of Y -fields. These are real closed fields R containing \mathbb{R} so that for every o-minimal expansion M of the field \mathbb{R} , the field R can be expanded to an elementary extension of M . An example of such a field is the residue field of a ring of continuous functions at a maximal or a minimal prime ideal. Parallel to the case of real algebraic geometry we develop the first order theory of Y -rings (replacing the notion of a real closed ring), where the commutative algebra of Y -fields takes place. Intuitively, a Y -ring is a model of the theory of rings of continuous functions.