We define a class of Steinitz existential structures, which in particular contains the fields of real and complex numbers.

We prove a general result on non-$\Sigma$–presentability of structures in hereditarily finite superstructures over such structures. As a corollary of this general result, we obtain that, if $\mathcal{M}$ is a Steinitz existential structure then the following structures cannot be embedded into a structure $\Sigma$–presentable over $\mathbb{HF}(\mathcal{M})$ with trivial equivalence: the Boolean algebra of all subsets of $\omega$, its factor modulo the ideal of finite sets, the group of all permutations on $\omega$, its factor modulo the subgroup of all finitary permutations, semigroup of all mappings from $\omega$ to $\omega$, the lattice of all open and the lattice of all closed sets of reals, the group of all $\Sigma$–definable permutations over $\mathbb{R}$, the group of all $\Sigma$–definable mappings from $\mathbb{R}$ to $\mathbb{R}$.

We also discuss some methods and open problems. (Received January 14, 2015)