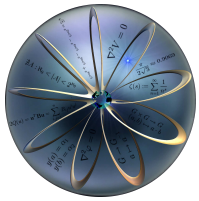

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example of nonperfect field

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In this entry, we exhibit an example of a field that is not a perfect field.

Let $F = \mathbb{F}_p(t)$, where $\mathbb{F}_p$ is the field with p elements and t transcendental over $\mathbb{F}_p$. The splitting field E of the irreducible polynomial $f = x^p - t$ is not separable over F. Indeed, if α is an element of E such that $\alpha^p = t$, we have

$$x^p - t = x^p - \alpha^p = (x - \alpha)^p,$$

which shows that f has one root of multiplicity p.