Exercises for the lecture *Model Theory of Fields* (WS 15/16) 20.10.2015

Week 1

1. Show that Fields_0, ACF, and ACF_p (p prime or zero) are not finitely axiomatizable.

2. Show that if an L_{ring}-sentence holds in some fields of arbitrarily large characteristic, then it also holds in some field of characteristic zero.

Find an L_{ring}-sentence that holds in some field of characteristic zero but does not hold in any field of positive characteristic. *Hint:* Think of $\mathbb{R}$.

3. Show that for an L_{ring}-sentence ϕ the following are equivalent:

(i) ϕ holds in some algebraically closed field of characteristic zero,

(ii) ϕ holds in all algebraically closed fields of characteristic zero,

(iii) ϕ holds in all algebraically closed fields of sufficiently large characteristic,

(iv) ϕ holds in some algebraically closed fields of arbitrarily large characteristic.