

## HOMEWORK TO SEMINAR 1 (17-18 Sep 2015)

Read the first chapter in Gorham: Philosophy of Science. Zeno's paradox about Achilles and the Tortoise is 2500 years old and still excellent food for thought. Think about the following questions and turn in your answers through KTH Social before the seminar. Also bring a printout to the seminar. These will be collected, read and commented by your teacher and returned at the following seminar. The electronic submission is used to register an entry in Rapp.

- (1) A *paradox* consists of three parts.

PREMISE consisting of facts and established truths.

ARGUMENT which is a logical derivation from the premise.

CONCLUSION which seems to be false.

In every paradox, either the premise is wrong, the argument is flawed or the conclusion is in fact true. In Zeno's paradox, state these three parts as clearly as possible and point out the error in one of them.

- (2) If Achilles starts with a baton in his right hand and switches hand for every completed part, in which hand will the baton be when he catches the tortoise?
- (3) In a variant of the paradox, Achilles runs the first part of the race at 1 m/s while the tortoise runs at  $1/2$  m/s, then they slow down to  $1/2$  m/s and  $1/3$  m/s, then to  $1/3$  m/s and  $1/4$  m/s etc. Now, in which part of the paradox will the error be? (Remember the *harmonic series*?)
- (4) Instead of racing, Achilles now draws marks on the road and the tortoise erases these marks, but only at half the speed in which they are made. So A makes marks 1 and 2 and T erases 1. Then A makes marks 3 and 4 and T erases 2. Clearly, the number of marks increases all the time, but every mark will eventually be erased by T, so the final result is an unmarked road. Analyse this paradox!