

1 Weekly main assignment for week 6 AST3220

Prepare for class (to be discussed in plenary)

- a) Give a brief discription of, and list the formulas for these universe distance measures: The comoving coordinate r , the proper distance d_P , the redshift z , the angular diameter distance d_A and the luminosity distance d_L .
- b) Pretend you are an observer. Which of the distance measures mentioned in a) would you be able to directly observe, and which would you have to calculate using other results? How would you measure them?
- c) Let's say you live in a universe with an unknown universe content and evolution. However, your universe is not unlike ours in that it is driven by the same physical forces and is filled with the same astrophysical phenomena. You assume your universe to be roughly homogenous and isotropic. How would you go about observeing to find out what kind of a universe you where living in, using your knowledge of universe distace measures?
- d) Explain briefly what an event horizon and a particle horizon is.
- e) You think your latest twitter post was so genius, it should be read in every corner of the universe. If your universe has an event horizon, will that still be possible? What if it has a particle horizon? What about the most exquisite piece of alien poetry? Will it ever reach earth if our universe has a particle horizon/event horizon?

Prepare or at least look at before class

Exercises 1.7, 1.8, 1.14, 1.15 in the lecture notes. For an extra challenge, have a go at problems 1.16 and 1.17 too.