ASTR 425/525
Cosmology

Worksheet #1

Monday, 08/18/2025

Question 1.

Homogeneity and isotropy refer to very different aspects of the Universe. Here, we want to explore how having one of these properties does not necessarily implies the other

(a) Sketch a universe that is homogeneous but not isotropic. Can you think of a physical situation where this could arise?

(b) Sketch a universe that is isotropic but not homogeneous. Can you think of a physical situation where this could arise?

Question 2.

In this question, we explore how homogeneity and isotropy can be related under certain circumstances. Argue that if a universe appears isotropic to two distinct observers separated by some distance d, then that universe must be homogeneous.