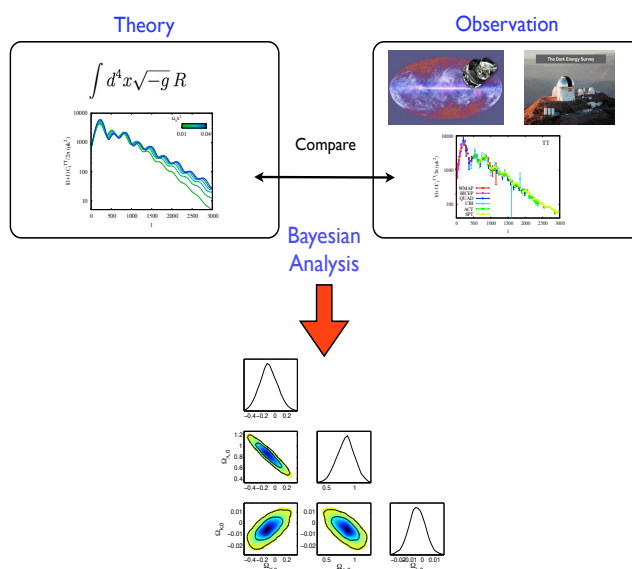


Updated Cosmology

with Python



José-Alberto Vázquez

ICF-UNAM / Kavli-Cambridge

In progress

August 12, 2017

Homework 13

1.- Compute

$$\Gamma_{0i}^0 = \partial_i \psi \quad (1)$$

$$\Gamma_{ij}^0 = \mathcal{H} \delta_{ij} - [\phi' + 2\mathcal{H}(\phi + \psi)] \delta_{ij} \quad (2)$$

$$\Gamma_{jk}^i = -2\delta_{(j}^i \delta_{k)} \phi + \delta_{jk} \delta^{il} \partial_l \phi \quad (3)$$

2.- Compute

$$R_{0i} = 2\partial_i \dot{\phi} + 2\mathcal{H} \partial_i \psi \quad (4)$$

$$\begin{aligned} R_{ij} = & [\dot{\mathcal{H}} + 2\mathcal{H}^2 - \ddot{\phi} + \nabla^2 \phi - 2(\dot{\mathcal{H}} + 2\mathcal{H}^2)(\phi + \psi) - \mathcal{H} \dot{\psi} - 5\mathcal{H} \dot{\phi}] \delta_{ij} \\ & + \partial_i \partial_j (\phi - \psi) \end{aligned} \quad (5)$$