Theoretical Astrophysics I: Physics of Sun and Stars
Lecture 5: Convection in stars versus convection simulations

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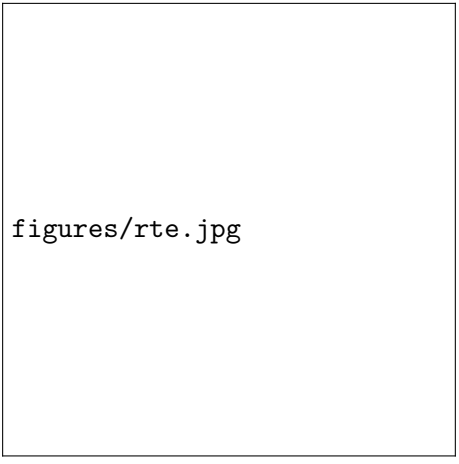
Radiative Transfer Equation

- Now, it makes sense that the absorption and emission properties of the medium depend on two things:
- Amount of matter capable of absorbing/emitting
- The inherent properties of the matter at the given temperature (T is very important!)
- So we define:

$$\kappa_\nu = \chi_\nu / \rho \tag{1}$$
$$j_\nu = \eta_\nu / \rho \tag{2}$$

- So our equation becomes:

$$\rho \frac{dI_\nu}{ds} = -\kappa_\nu I_\nu + j_\nu \tag{3}$$



Optical depth and Source function

- Now, it makes sense that the absorption and emission properties of the medium depend on two things:
- Amount of matter capable of absorbing/emitting
- The inherent properties of the matter at the given temperature (T is very important!)
- So we define:

$$\kappa_\nu = \chi_\nu / \rho \tag{4}$$

$$j_\nu = \eta_\nu / \rho \tag{5}$$

- So our equation becomes:

$$\rho \frac{dI_\nu}{ds} = -\kappa_\nu I_\nu + j_\nu \tag{6}$$

figures/rte.jpg