Handout 5b: Binary Stars conclusions

The mass-luminosity relationship for the main sequence is crucial for guiding models (Fig. 7.7)

On a log-log plot, nearly a steep, straight line with slope 4

 \Box Naturally passing through 1 M_{sun}, 1 L_{sun}.

Implies L = const. x M⁴

Derive

Stellar evolution theory must reproduce this

L vs M on Main Sequence Fig. 7.7 C & O



Stellar radii from eclipsing binaries



Times give radii (velocities from Doppler shifts):

$$t_g - t_e = t_h - t_f = \frac{2 \cdot r_1}{v_2} \qquad t_f - t_e = t_h - t_g = \frac{2 \cdot r_2}{v_2}$$

and since $L = 4 \cdot \pi \cdot r^2 \cdot \sigma \cdot T^4$ we also get effective T's