

# introduction



We have now derived the four differential equations of stellar structure. We have seen that completely accurate expressions for the three associated relations of pressure, opacity and energy generation are extremely complicated, but it is possible to find simple, approximate forms for them.

The equations of stellar structure are too complex to find an exact analytical solution and hence they must be solved using a computer. It is possible, however, to verify the gradient of the main sequence in the HR diagram and of the mass-luminosity relation without solving the equations of stellar structure completely. In what follows, we shall describe how this can be done. We shall then look at an example of a simple stellar model, known as a polytrope, in which we assume a relation between pressure and density that enables the equations of stellar structure to be solved in a straightforward manner on a computer. Finally, we shall look at the results of a full solution of the equations of stellar structure derived using a computer, describe what these detailed models teach us about the interiors of stars and how the results compare with observations.