CHAPTER OVERVIEW

2: The Calculus of Variations

We've seen how Whewell solved the problem of the equilibrium shape of chain hanging between two places, by finding how the forces on a length of chain, the tension at the two ends and its weight, balanced. We're now going to look at a completely different approach: the equilibrium configuration is an energy minimum, so small deviations from it can only make second-order changes in the gravitational potential energy. Here we'll find how analyzing that leads to a differential equation for the curve, and how the technique developed can be successfully applied of a vast array of problems.