

CHAPTER OVERVIEW

8: Approximate Methods

So far, we have concentrated on problems that were analytically solvable, such as the simple harmonic oscillator, the hydrogen atom, and square well type potentials. In fact, we shall soon be confronted with situations where an exact analytic solution is unknown: more general potentials, or atoms with more than one electron. To make progress in these cases, we need approximation methods. The best known method is perturbation theory, which has proved highly successful over a wide range of problems (but by no means all).

[8.1: Variational Methods](#)

[8.2: The WKB Approximation](#)

[8.3: Note on the WKB Connection Formula](#)

Thumbnail: Two (or more) wave functions are mixed by linear combination. The coefficients c_1 , c_2 determine the weight each of them is given. The optimum coefficients are found by searching for minima in the potential landscape spanned by c_1 and c_2 . (CC BY-SA 3.0; Rudolf Winter at Aberystwyth University).

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