

Module MA2341 (Frolov), Advanced Mechanics I
Homework Sheet 6

Each set of homework questions is worth 100 marks

Study chapter IV of Landau-lifshitz's book.

Problem 1

Derive eq.(17.5) from Landau-Lifshitz, p.46.

Problem 2

A beam of particles moving along the z -axis from $z = -\infty$ is scattered by a perfectly rigid paraboloid $z = a(x^2 + y^2)$, $a > 0$. Find the differential cross-section for this scattering.

Problem 3

Derive eq.(19.8) from Landau-Lifshitz, p.54.

Problem 4

Determine the differential cross-section for small-angle scattering in a field

$$U(r) = \frac{\kappa}{\sqrt{r^2 + a^2}},$$

where κ and a are constants.