

Quantum Mechanics I

Problem Set 6

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Due: Monday, February 29th 2016

Problem 6.1

Verify that Y_0^0 and Y_2^1 are normalized and orthogonal.

Problem 6.2

Verify that Y_3^2 and Y_l^l satisfy the angular equation.

Problem 6.3

Sketch or google a visual representation of Y_0^0 , Y_2^1 and Y_3^2 .

Problem 6.4

The Legendre polynomials can be defined by

$$P_l(x) = \frac{1}{2^l l!} \left(\frac{d}{dx} \right)^l (x^2 - 1)^l.$$

Calculate

$$\int_{-1}^1 P_l(x) P_{l'}(x) dx$$

by using integration by parts.