

Quantum Mechanics

Table of Laguerre Polynomials

Obtained with the equation $L_q = e^x \frac{d^q}{dx^q} e^{-x} x^q$

These are the polynomials needed for the radial wave function of the electron in the hydrogen atom.

$$L_0 = 1$$

$$L_1 = -x + 1$$

$$L_2 = x^2 - 4x + 2$$

$$L_3 = -x^3 + 9x^2 - 18x + 6$$

$$L_4 = x^4 - 16x^3 + 72x^2 - 96x + 24$$

$$L_5 = -x^5 + 25x^4 - 200x^3 + 600x^2 - 600x + 120$$

$$L_6 = x^6 - 36x^5 + 450x^4 - 2400x^3 + 5400x^2 - 4320x + 720$$

$$L_7 = -x^7 + 49x^6 - 882x^5 + 7350x^4 - 29400x^3 + 59920x^2 - 35280x + 5040$$

$$L_8 = x^8 - 64x^7 + 1568x^6 - 18816x^5 + 117600x^4 - 376320x^3 + 564480x^2 - 322560x + 40320$$

$$L_9 = -x^9 + 81x^8 - 2592x^7 + 42336x^6 - 381024x^5 + 1905120x^4 - 5080320x^3 + 6531840x^2 - 3265920x + 362880$$

$$L_{10} = x^{10} - 100x^9 + 4050x^8 - 86400x^7 + 1058400x^6 - 7620480x^5 + 31752000x^4 - 72576000x^3 + 81648000x^2 - 36288000x + 3628800$$