

[2] `from sympy import *`

[3] `r, l = symbols('r l', positive=True, real=True)
c0, c2, c4, c6, c8, c10, c12 = symbols('c0 c2 c4 c6 c8 c10 c12',
real=True)`

[9] `#p = c0 + c2*r**2 + c4*r**4 + c6*r**6 + c8*r**8 + c10*r**10 +
c12*r**12
R = Function('R')
p = log(R(r)/r**(l+1))`

[10] `p`

$$\log\left(r^{-l-1}R(r)\right)$$

[16] `simplify(diff(p,r))`

$$-\frac{l}{r} + \frac{\frac{d}{dr}R(r)}{R(r)} - \frac{1}{r}$$

[17] `simplify(diff(p,r,2))`

$$\frac{l}{r^2} + \frac{\frac{d^2}{dr^2}R(r)}{R(r)} - \frac{\left(\frac{d}{dr}R(r)\right)^2}{R^2(r)} + \frac{1}{r^2}$$

[18] `simplify(diff(p,r,3))`

$$-\frac{2l}{r^3} + \frac{\frac{d^3}{dr^3}R(r)}{R(r)} - \frac{3\frac{d}{dr}R(r)\frac{d^2}{dr^2}R(r)}{R^2(r)} + \frac{2\left(\frac{d}{dr}R(r)\right)^3}{R^3(r)} - \frac{2}{r^3}$$

[19] `simplify(diff(p,r,4))`

$$\frac{6l}{r^4} + \frac{\frac{d^4}{dr^4}R(r)}{R(r)} - \frac{4\frac{d}{dr}R(r)\frac{d^3}{dr^3}R(r)}{R^2(r)} - \frac{3\left(\frac{d^2}{dr^2}R(r)\right)^2}{R^2(r)} + \frac{12\left(\frac{d}{dr}R(r)\right)^2\frac{d^2}{dr^2}R(r)}{R^3(r)} - \frac{6\left(\frac{d}{dr}R(r)\right)^4}{R^4(r)}$$

