# Integration using Trapezoid and Romberg Method

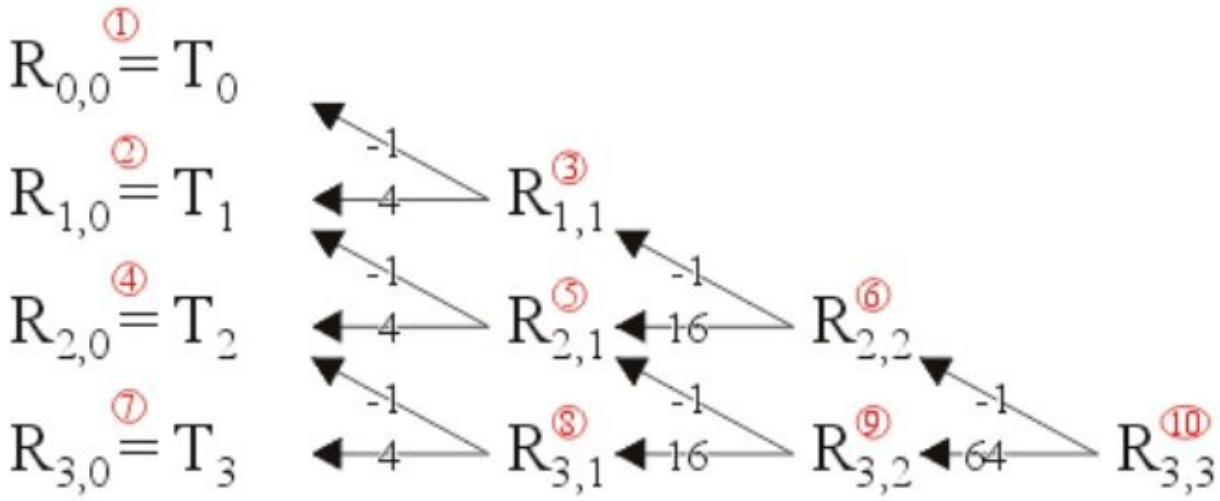


Figure 1. Calculating the Romberg approximations.

The above stated indices are consistent with the code in which,a matrix has been used , thus , indices begin from 0.

Furthermore, the submitted program is one order higher than what is depicted in the picture.

R(p,0) are equated to T(p) since Trapezoid method is being used to calculate them.

The program finds these values column wise,from left to right

$$R_k^i = \frac{4^i R_k^{i-1} - R_{k-1}^{i-1}}{4^i - 1}$$

This is the formula used to calculate the corrected intergrals of the higher order Romberg Method

The values of R[k][j] are :

| R[0:4][0] | R[1:4][1] | R[2:4][2] | R[3:4][3] | R[4][4] |
|---|---|---|---|---|
| 1.518745e-08 | | | | |
| 1.518757e-08 | 1.518761e-08 | | | |
| 1.518746e-08 | 1.518742e-08 | 1.518740e-08 | | |
| 1.518739e-08 | 1.518737e-08 | 1.518736e-08 | 1.518736e-08 | |
| 1.518755e-08 | 1.518761e-08 | 1.518762e-08 | 1.518763e-08 | 1.518763e-08 |