In function G4VRangeToEnergyConverter::BuildRangeVector variable q:

$$q = \frac{T}{\left(\frac{dT}{dx}\right)} = \frac{dx}{d\ln T}$$

is integrated with constant step in ln*T* named *dltau*. Intermediate variable *s0* and integral value *Value* at the point number *i* are used:

$$(s_0)_i = \frac{q_0}{2} + \sum_{k=1}^{i} q_k,$$

$$Value_i = \begin{cases} \left((s_0)_0 + \frac{q_0}{2}\right) \cdot dltau, & i = 0 \\ \left((s_0)_i - \frac{q_i}{2}\right) \cdot dltau, & i > 0 \end{cases}.$$

So

$$Value_0 = q_0 \cdot dltau,$$

$$Value_{i\geq 1} = \left(\frac{q_0}{2} + \sum_{k=1}^{i} q_k - \frac{q_i}{2}\right) \cdot dltau,$$

$$Value_{i\geq 1} = \left(\sum_{k=1}^{i} \frac{q_k}{2} + \sum_{k=1}^{i} \frac{q_k}{2} + \frac{q_0}{2} - \frac{q_i}{2}\right) \cdot dltau,$$

$$Value_{i\geq 1} = \left(\sum_{k=1}^{i} \frac{q_k}{2} + \sum_{k=0}^{i-1} \frac{q_k}{2}\right) \cdot dltau,$$

$$Value_{i\geq 1} = \left(\sum_{k=1}^{i} \frac{q_k}{2} + \sum_{k=1}^{i} \frac{q_{k-1}}{2}\right) \cdot dltau,$$

$$Value_{i\geq 1} = \sum_{k=1}^{i} \left(\frac{q_{k-1}}{2} + \frac{q_k}{2}\right) \cdot dltau.$$

Thus, starting from $i = 1$ values $Value_i$ are indeed integral of variable q_i, calculated by trapezoidal rule (https://en.wikipedia.org/wiki/Trapezoidal_rule) but not by Simpson's rule (https://en.wikipedia.org/wiki/Simpson%27s_rule), as stated in the line 363 of file *G4VRangeToEnergyConverter.cc*. But

$$Value_1 - Value_0 = (q_1 - q_0)/2 \cdot dltau$$

and it is not the approximation of the integral on the interval $i \in [0,1]$. Probably in the line 382 of file *G4VRangeToEnergyConverter.cc* it should be used '-' instead of '+'.