This is the kind of thing to calculate :

$$W(i,j,l) = X(i) + \sum_{j,k}^{j,k \in R} Y(i,j) Z(k,l) \delta_{jk}$$

The $W(i,j,l)$ takes three integers, i, j, l, as inputs, and returns a number, e.g.,

$$W(1,2,3) = 7$$

It is a better to think of, $W(i,j,l)$, as a function, not an array. It is to described by an instance of the term class, which contains this function.

$$W(i,j,l) = X(i) + \sum_{j,k}^{j,k\in R} Y(i,j)Z(k,l)\delta_{jk}$$

The $\sum$ sums over all indices, j , k, in the range R. E.g., if $R = \{0,1\}$

$$\sum_{j,k}^{j,k\in R} Y(i,j)Z(k,l)\delta_{jk} =$$

$$Y(i,0)Z(0,l)\delta_{00} + Y(i,0)Z(1,l)\delta_{01} + Y(i,1)Z(0,l)\delta_{10} + Y(i,1)Z(1,l)\delta_{11}$$

The δ_{jk} constrains the indices according to

$$\delta_{jk} = \begin{cases} 1 & \text{if} \quad j == k \\ 0 & \text{otherwise} \end{cases}$$

So

$$\sum_{j,k}^{j,k\in R} Y(i,j)Z(k,l)\delta_{jk} =$$

$$Y(i,0)Z(0,l) + Y(i,1)Z(1,l)$$

This is how I'm splitting it up into classes :

Range

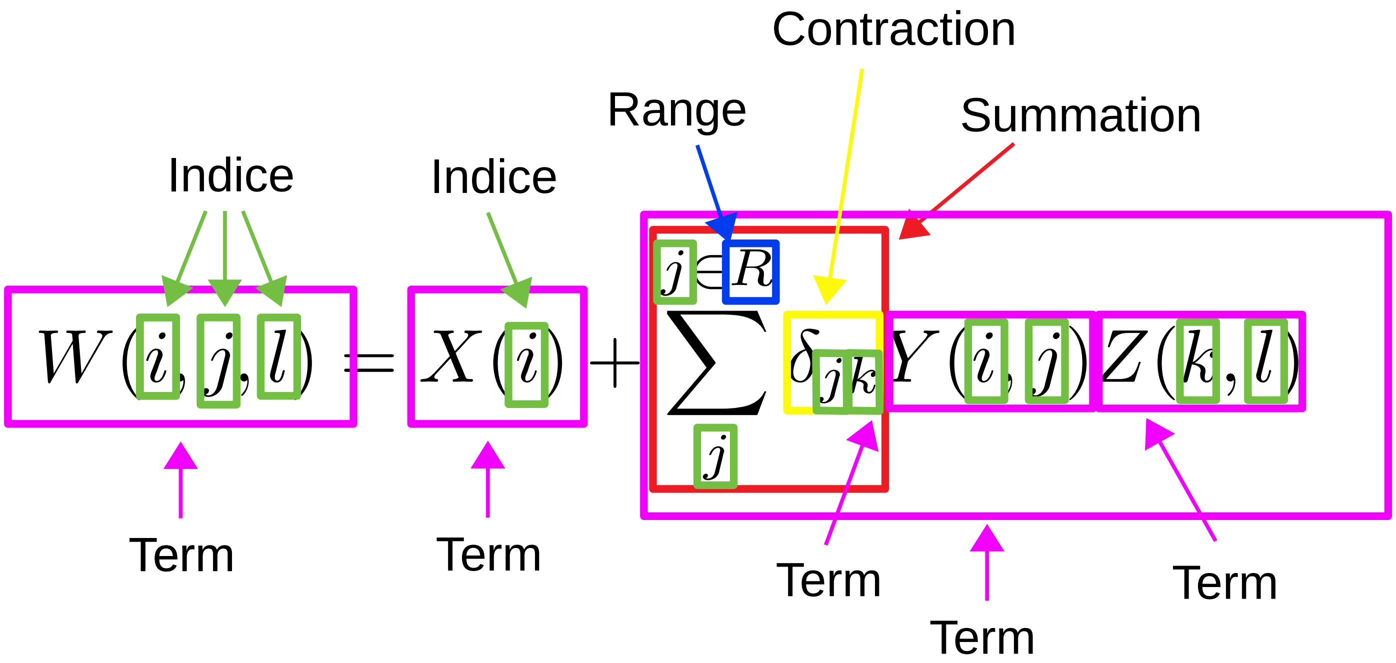
Indice

Summation

$$\underbrace{W(i,j,l)}_{\text{Term}} = \underbrace{X(i)}_{\text{Term}} + \underbrace{\sum_{j}^{j\in R} Y(i,j)Z(k,l)\delta_{jk}}_{\text{Term}}$$

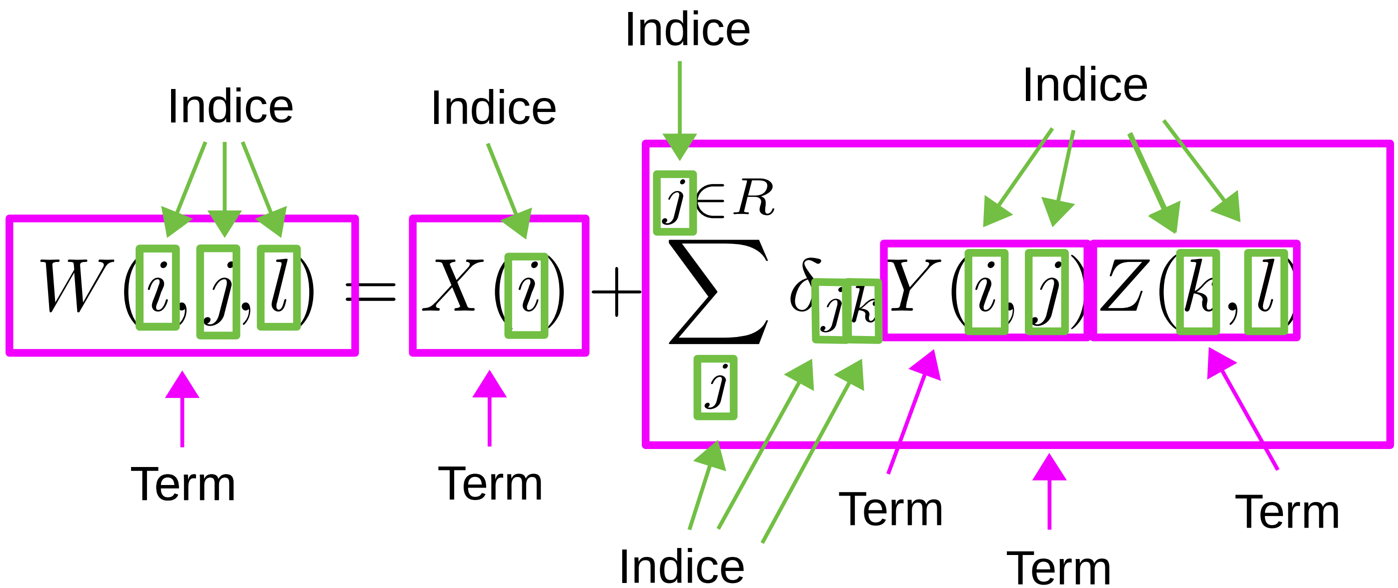
It's important that terms can be defined recursively. For example, in the below W(i,j,k) is being used to define Q(j) :

$$Q(j) = \overset{\text{Term}}{U(j)} + \underbrace{\overbrace{\sum_{m,n}^{m,n\in R^m} \quad \sum_{i,k}^{i,j\in R^i}}^{\text{Summation}} \overset{\text{Term}}{V(m,n)}\overset{\text{Term}}{W(i,j,k)}}_{\text{Term}}$$



This is hopefully a bit clearer…. If “Box A” is inside “Box A”, then the definition of the class corresponding to “Box A” contains a field which is of the class corresponding to “Box B”.

The following slides break it down into smaller chunks for clarity.


Indice
Indice
Indice
Indice
$W(i,j,l) = X(i) + \sum_{j}^{j \in R} \delta_{jk} Y(i,j) Z(k,l)$
Term
Term
Term
Term
Term
Indice

$$\underbrace{\boxed{W(i,j,l)}}_{\text{Term}} = \underbrace{\boxed{X(i)}}_{\text{Term}} + \underbrace{\boxed{\sum_{j}^{j\in R} \delta_{jk} \underbrace{\boxed{Y(i,j)}}_{\text{Term}} \underbrace{\boxed{Z(k,l)}}_{\text{Term}}}}_{\text{Term}}$$

Indice

Indice Indice Indice

$$W(\boxed{i},\boxed{j},\boxed{l}) = X(\boxed{i}) + \sum_{\boxed{j}}^{\boxed{j}\in R} \delta_{\boxed{j}\boxed{k}} Y(\boxed{i},\boxed{j}) Z(\boxed{k},\boxed{l})$$

Indice

Range

Summation

$$W(i,j,l) = X(i) + \boxed{\sum_{j}^{j \in \boxed{R}} \boxed{\delta_{jk}}}\, Y(i,j) Z(k,l)$$

Contraction

Summation

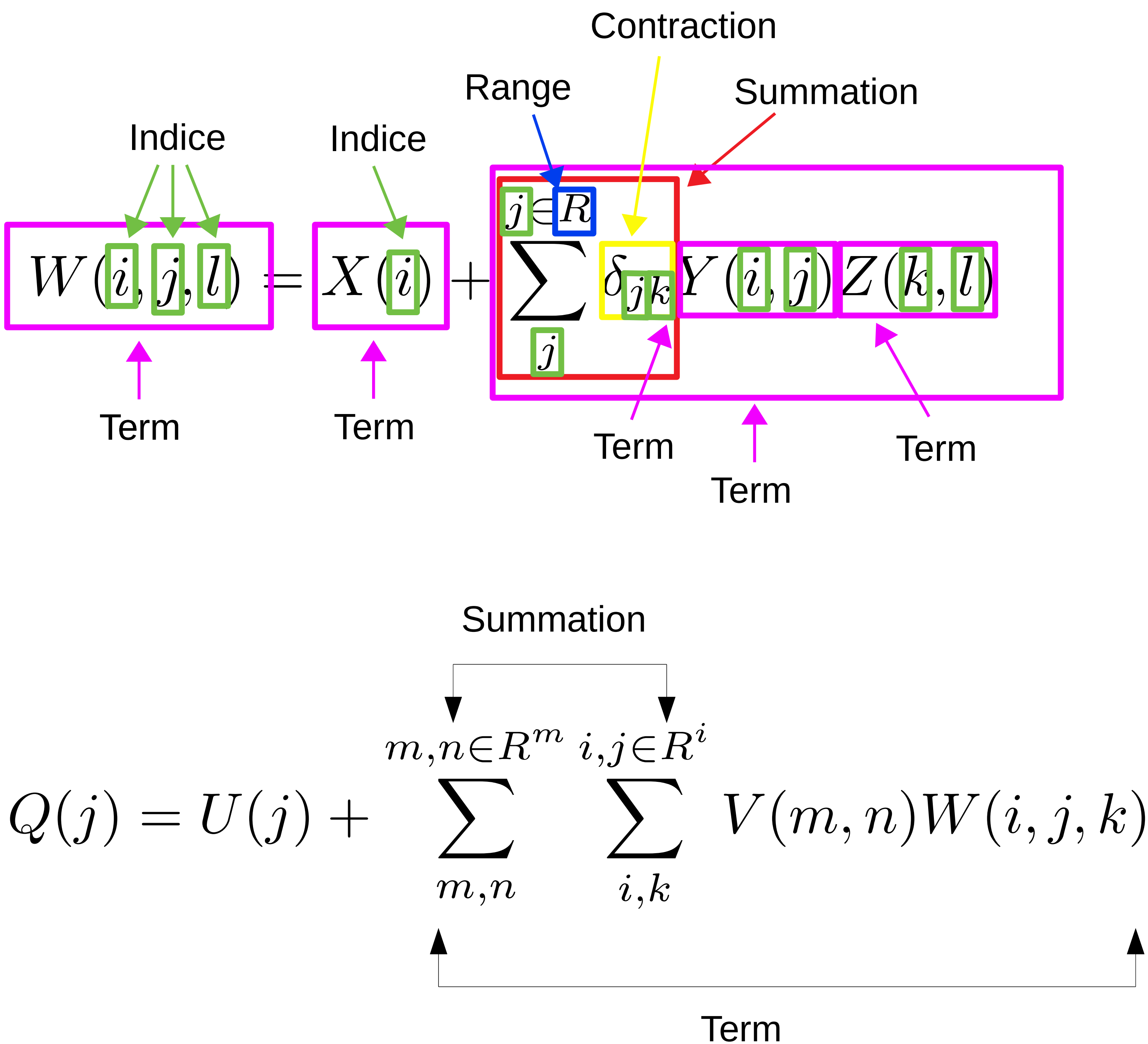
$$W(i,j,l) = X(i) + \boxed{\sum_{j}^{j\in R} \delta_{jk}} Y(i,j)Z(k,l)$$

Range

$$W(i,j,l) = X(i) + \sum_{j}^{j \in \boxed{R}} \delta_{jk} Y(i,j) Z(k,l)$$

$$W(i,j,l) = X(i) + \sum_{j}^{j \in R} \boxed{\delta_{jk}} Y(i,j) Z(k,l)$$

Contraction



Contraction
Range
Summation
Indice
Indice
$W(i,j,l) = X(i) + \sum_{j}^{j\in R} \delta_{jk} Y(i,j) Z(k,l)$
Term
Term
Term
Term
Term
Summation
$Q(j) = U(j) + \sum_{m,n}^{m,n\in R^m} \sum_{i,k}^{i,j\in R^i} V(m,n)W(i,j,k)$
Term