

## Example 5a Keeping focused

```
1 {a,b,c,d,e,f,h,i,j,k,l,m,n,o,p,q,r,s,t,u#}::Indices.
2
3 expr := A_{a} v^{a} + B_{a} v^{a} + C_{a} v^{a}. # cdb (ex-05.100,expr)
4
5 zoom (expr,$B_{a} Q???) # cdb (ex-05.101,expr)
6 substitute (expr, $v^{a} -> w^{a}$) # cdb (ex-05.102,expr)
7 unzoom (expr) # cdb (ex-05.103,expr)
8
9 checkpoint.append (expr)
```

$$A_a v^a + B_a v^a + C_a v^a = \dots + B_a v^a + \dots \quad (\text{ex-05.101})$$

$$= \dots + B_a w^a + \dots \quad (\text{ex-05.102})$$

$$= A_a v^a + B_a w^a + C_a v^a \quad (\text{ex-05.103})$$

## Example 5b Tags

```
1 {a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u#}::Indices(position=independent).
2
3 def add_tags (obj,tag):
4     n = 0
5     ans = Ex('0')
6     for i in obj.top().terms():
7         foo = obj[i]
8         bah = Ex(tag+'_'+str(n)+'')
9         ans := @(ans) + @(bah) @(foo).
10        n = n + 1
11    return ans
12
13 def clear_tags (obj,tag):
14     ans := @(obj).
15     foo = Ex(tag+'_{a?} -> 1')
16     substitute (ans,foo)
17     return ans
18
19 expr := 2 V_{p q} - 3 V_{q p}. # cdb (ex-05.200,expr)
20
21 expr = add_tags (expr,'\mu') # cdb (ex-05.201,expr)
22
23 zoom (expr, $\mu_{1} Q??$) # cdb (ex-05.202,expr)
24 substitute (expr, $V_{a b} -> - V_{b a}$) # cdb (ex-05.203,expr)
25 unzoom (expr) # cdb (ex-05.204,expr)
26
27 expr = clear_tags (expr,'\mu') # cdb (ex-05.205,expr)
28
29 checkpoint.append (expr)
```

$$2V_{pq} - 3V_{qp} = 2\mu_0 V_{pq} - 3\mu_1 V_{qp} \quad (\text{ex-05.201})$$

$$= \dots - 3\mu_1 V_{qp} \quad (\text{ex-05.202})$$

$$= \dots + 3\mu_1 V_{pq} \quad (\text{ex-05.203})$$

$$= 2\mu_0 V_{pq} + 3\mu_1 V_{pq} \quad (\text{ex-05.204})$$

$$= 5V_{pq} \quad (\text{ex-05.205})$$