

## Exercise 4.2 Inconsistent free indices

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1  {a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w#}::Indices(position=independent).
2
3  def deriv (poly):
4
5      \delta^{a}::Weight(label=\epsilon).
6
7      bah := @(poly).
8
9      substitute      (bah,$x^{a} -> x^{a} + \delta^{a}$)
10     distribute      (bah)
11
12     foo := @(bah) - @(poly).
13
14     keep_weight      (foo, $\epsilon = 1$)
15     substitute      (foo, $\delta^{a} -> 1$)
16
17     return foo
18
19     # -----
20
21     poly := c^{a}
22           + c^{a}_{b} x^b
23           + c^{a}_{b c} x^b x^c.      # cdb (ex-0402.100,poly)
24
25     dpoly = deriv (poly)              # cdb (ex-0402.101,dpoly)

```

$$p = c^a + c^a_b x^b + c^a_{bc} x^b x^c \quad (\text{ex-0402.100})$$

$$dp = c^a_b + c^a_{bc} x^b + c^a_{bc} x^c \quad (\text{ex-0402.101})$$