

Exercise 6.10a A problem with evaluate

```
1  {\theta, \varphi}::Coordinate.
2  {a,b,c,d,e,f,g,h#}::Indices(values={\theta, \varphi}, position=independent).
3
4  \partial{#}::PartialDerivative.
5
6  V_{a}::Depends(\theta,\varphi,\partial{#}).
7
8  dVrule := { \partial_{\theta}V_{\varphi} = \sin(\theta),
9              \partial_{\varphi}V_{\theta} = \cos(\theta)}. # cdb(ex-0610.101,dVrule)
10 dV := \partial_bV_a - \partial_aV_b. # cdb(ex-0610.102,dV)
11
12 evaluate (dV, dVrule) # cdb(ex-0610.103,dV)
```

Traceback (most recent call last):

File "/usr/local/bin/cadabra2", line 248, in <module>

exec(cmp)

File "ex-0610.py", line 27, in <module>

evaluate (dV, dVrule)

RuntimeError: Dependencies on derivatives are not yet handled in the SymPy bridge

Exercise 6.10b A work around

```

1  {\theta, \varphi}::Coordinate.
2  {a,b,c,d,e,f,g,h#}::Indices(values={\theta, \varphi}, position=independent).
3
4  \partial{#}::PartialDerivative.
5
6  V_{a}::Depends(\theta,\varphi,\partial{#}).
7
8  hide := \partial_{a}{V_{b}} -> dV_{a b}.
9
10 dVrule := { dV_{\theta\varphi} = \sin(\theta),
11             dV_{\varphi\theta} = \cos(\theta)}.      # cdb(ex-0610.201,dVrule)
12 dV := \partial_{b}{V_{a}} - \partial_{a}{V_{b}}.        # cdb(ex-0610.202,dV)
13
14 substitute (dV, hide)                             # cdb(ex-0610.212,dV)
15 evaluate (dV, dVrule)                             # cdb(ex-0610.203,dV)

```

The workaround here is to to hide the derivatives before calling `evaluate`.

$$dV_{ba} - dV_{ab} \quad (\text{ex-0610.212})$$

$$dV_{ab} = \partial_b V_a - \partial_a V_b \quad (\text{ex-0610.202})$$

$$= \square_{ab} \begin{cases} \square_{\varphi\theta} = \sin \theta - \cos \theta \\ \square_{\theta\varphi} = -\sin \theta + \cos \theta \end{cases} \quad (\text{ex-0610.203})$$