

Pensieve header: A Zip Demo.

ZipDemo

```
In[ ]:= z* =  $\xi$ ;  $\xi^*$  = z; Zip_{\{ \}} [P_] := P;
Zip_{\{ \xi, \xi^* \}} [P_] := (Expand[P // Zip_{\{ \xi \}}] /. f_ .  $\xi^{d_}$  .  $\Rightarrow \partial_{\{ \xi^*, d \}} f$ ) /.  $\xi^* \rightarrow 0$ 
```

ZipDemo

```
In[ ]:= {Zip_{\{ \xi \}} [ $\xi^2 e^{\delta z^2}$ ], Zip_{\{ \xi \}} [ $\xi^4 e^{\delta z^2}$ ] }
```

ZipDemo

```
Out[ ]:= {2  $\delta$ , 12  $\delta^2$  }
```

GZip

```
 $\mathbb{E}$  /: Zip_{ $\xi^s$  List} @  $\mathbb{E}$  [Q_, P_] := (*  $\mathbb{E}$  [Q,P] means  $e^{QP}$  *)
Module[{ $\xi$ , z, zs, c, ys,  $\eta$ s, qt, zrule, Q1, Q2},
  zs = Table[ $\xi^*$ , { $\xi$ ,  $\xi^*$  }];
  c = Q /. Alternatives @@ ( $\xi^s \cup zs$ )  $\rightarrow 0$ ;
  ys = Table[ $\partial_{\xi}$  (Q /. Alternatives @@ zs  $\rightarrow 0$ ), { $\xi$ ,  $\xi^*$  }];
   $\eta$ s = Table[ $\partial_z$  (Q /. Alternatives @@  $\xi^s \rightarrow 0$ ), {z, zs}];
  qt = Inverse@Table[K $\delta_{z, \xi^*} - \partial_{z, \xi} Q$ , { $\xi$ ,  $\xi^*$  }, {z, zs}];
  zrule = Thread[zs  $\rightarrow$  qt . (zs + ys)];
  Q1 = c +  $\eta$ s . zs /. zrule; Q2 = Q1 /. Alternatives @@ zs  $\rightarrow 0$ ;
  Simplify /@  $\mathbb{E}$  [Q2, Det[qt]  $e^{-Q2}$  Zip_{ $\xi^s$ } [ $e^{Q1}$  (P /. zrule)]]];
```