Pensieve header: Even better learning from experience.

In[•]:=
```
$k = 3
```

Out[•]=
```
3
```

In[•]:=
```
t2b[ni_,$k_] := Block[{i}, t2b[i_,$k] = 𝔼[α[i] a[i] - τ[i] γ b[j], ξ[i] x[i] + η[i] y[i], ℯ^(ϵ τ[i] a[i]) + O[ϵ]^($k+1)]; t2b[ni,$k]];
t2b[i_] := t2b[i,$k]
```

In[•]:=
```
?? Subscript
```

Subscript[x, y] is an object that formats as x_y.
Subscript[$x, y_1, y_2, \ldots$] formats as $x_{y_1,y_2,\ldots}$. ≫

```
Attributes[Subscript] = {NHoldRest}

Subscript[t2b, ni_, $k_] := Block[{i},
  Subscript[t2b, i_, $k] = 𝔼[Subscript[α, i] Subscript[a, i] - Subscript[τ, i] γ Subscript[b, j],
    Subscript[ξ, i] Subscript[x, i] + Subscript[η, i] Subscript[y, i],
    ℯ^(ϵ Subscript[τ,i] Subscript[a,i]) + O[ϵ]^($k+1)];
  Subscript[t2b, ni, $k]]

Subscript[t2b, i_] := Subscript[t2b, i, $k]
```

In[•]:=
```
t2b[i,2]
```

Out[•]=
$$\mathbb{E}\left[a_i\,\alpha_i-\gamma\,b_j\,\tau_i,\ y_i\,\eta_i+x_i\,\xi_i,\ 1+a_i\,\tau_i\,\epsilon+\frac{1}{2}\,a_i^2\,\tau_i^2\,\epsilon^2+O[\epsilon]^3\right]$$

In[•]:=
```
t2b[i,2]
```

Out[•]=
$$\mathbb{E}\left[a_i\,\alpha_i-\gamma\,b_j\,\tau_i,\ y_i\,\eta_i+x_i\,\xi_i,\ 1+a_i\,\tau_i\,\epsilon+\frac{1}{2}\,a_i^2\,\tau_i^2\,\epsilon^2+O[\epsilon]^3\right]$$

In[•]:=
```
t2b[1]
```

Out[•]=
$$\mathbb{E}\left[a_1\,\alpha_1-\gamma\,b_j\,\tau_1,\ y_1\,\eta_1+x_1\,\xi_1,\ 1+a_1\,\tau_1\,\epsilon+\frac{1}{2}\,a_1^2\,\tau_1^2\,\epsilon^2+\frac{1}{6}\,a_1^3\,\tau_1^3\,\epsilon^3+O[\epsilon]^4\right]$$

In[•]:=
```
?? Subscript
```

Subscript[x, y] is an object that formats as x_y.

Subscript[$x, y_1, y_2, \ldots$] formats as $x_{y_1,y_2,\ldots}$. ≫

```
Attributes[Subscript] = {NHoldRest}

Subscript[t2b, i$_, 2] = 𝔼[Subscript[a, i$] Subscript[α, i$] - γ Subscript[b, j] Subscript[τ, i$],
  Subscript[y, i$] Subscript[η, i$] + Subscript[x, i$] Subscript[ξ, i$],
  1 + Subscript[a, i$] Subscript[τ, i$] ϵ + 1/2 Subscript[a, i$]^2 Subscript[τ, i$]^2 ϵ^2 + O[ϵ]^3]

Subscript[t2b, i$_, 3] = 𝔼[Subscript[a, i$] Subscript[α, i$] - γ Subscript[b, j] Subscript[τ, i$],
  Subscript[y, i$] Subscript[η, i$] + Subscript[x, i$] Subscript[ξ, i$],
  1 + Subscript[a, i$] Subscript[τ, i$] ϵ + 1/2 Subscript[a, i$]^2 Subscript[τ, i$]^2 ϵ^2 +
   1/6 Subscript[a, i$]^3 Subscript[τ, i$]^3 ϵ^3 + O[ϵ]^4]

Subscript[t2b, ni_, $k_] := Block[{i},
  Subscript[t2b, i_, $k] = 𝔼[Subscript[α, i] Subscript[a, i] - Subscript[τ, i] γ Subscript[b, j],
    Subscript[ξ, i] Subscript[x, i] + Subscript[η, i] Subscript[y, i],
    e^(ϵ Subscript[τ,i] Subscript[a,i]) + O[ϵ]^($k+1)];
  Subscript[t2b, ni, $k]]

Subscript[t2b, i_] := Subscript[t2b, i, $k]
```

```
In[•]:= f[0] = f[1] = 1;
        f[n_] := Once[Echo@n; f[n - 1] + f[n - 2]];
        f[100]
Out[•]= 573 147 844 013 817 084 101
```

```
In[•]:= $k = 2;
        Boot[$k_] := Once[Block[{i, tu = TimeUsed[]},
            b2t_{i_,$k} = 𝔼[α_i a_i - β_i t_i / γ, ξ_i x_i + η_i y_i, e^(ϵ β_i a_i/γ) + O[ϵ]^($k+1)];
            Print["Booted @ $k=", $k, " in ", TimeUsed[] - tu, " sec."];
           ]];
        b2t_{i_} := b2t_{i,$k}; b2t_{i_,$k_} := (Boot[$k]; b2t_{i,$k});
        "more like that";

In[•]:= b2t_3

        Booted @ $k=2 in 0.015 sec.

Out[•]= 𝔼[a_3 α_3 - t_3 β_3/γ, y_3 η_3 + x_3 ξ_3, 1 + a_3 β_3 ϵ/γ + a_3^2 β_3^2 ϵ^2/(2 γ^2) + O[ϵ]^3]

In[•]:= b2t_2

Out[•]= 𝔼[a_2 α_2 - t_2 β_2/γ, y_2 η_2 + x_2 ξ_2, 1 + a_2 β_2 ϵ/γ + a_2^2 β_2^2 ϵ^2/(2 γ^2) + O[ϵ]^3]
```

In[•]:=
```
Block[{$k = 2}, b2t2]
```

Out[•]=
$$\mathbb{E}\left[a_2\,\alpha_2 - \frac{t_2\,\beta_2}{\gamma},\ y_2\,\eta_2 + x_2\,\xi_2,\ 1 + \frac{a_2\,\beta_2\,\epsilon}{\gamma} + \frac{a_2^2\,\beta_2^2\,\epsilon^2}{2\,\gamma^2} + O[\epsilon]^3\right]$$

In[•]:=
```
Block[{$k = 4}, b2t2]
```

```
Booted @ $k=4 in 0. sec.
```

Out[•]=
$$\mathbb{E}\left[a_2\,\alpha_2 - \frac{t_2\,\beta_2}{\gamma},\ y_2\,\eta_2 + x_2\,\xi_2,\ 1 + \frac{a_2\,\beta_2\,\epsilon}{\gamma} + \frac{a_2^2\,\beta_2^2\,\epsilon^2}{2\,\gamma^2} + \frac{a_2^3\,\beta_2^3\,\epsilon^3}{6\,\gamma^3} + \frac{a_2^4\,\beta_2^4\,\epsilon^4}{24\,\gamma^4} + O[\epsilon]^5\right]$$

In[•]:=
```
$k = 3
```

Out[•]=
```
3
```

In[•]:=
```
t2b_i_,$k_ := (Block[{i}, t2b_i_,$k = 𝔼[α_i a_i - τ_i γ b_j, ξ_i x_i + η_i y_i, e^(ϵ τ_i a_i) + O[ϵ]^($k+1)]]; t2b_i,$k);
t2b_i_ := t2b_i,$k
```

RuleDelayed: Pattern i_ appears on the right-hand side of rule

```
t2b_i_,$k_ :> (Block[{i}, t2b_i_,$k = 𝔼[Subscript[≪2≫] Subscript[≪2≫] - Times[≪3≫], Subscript[≪2≫] Subscript[≪2≫] + Subscript[
    ≪2≫] Subscript[≪2≫], e^Times[≪3≫] + O[≪1≫]^Plus[≪2≫]]]; t2b_i,$k).
```

In[•]:=
```
?? Subscript
```

Subscript[x, y] is an object that formats as x_y.
Subscript[x, y_1, y_2, …] formats as $x_{y_1,y_2,\ldots}$. ≫

```
Attributes[Subscript] = {NHoldRest}

Subscript[t2b, i_, $k_] := (Block[{i},
    Subscript[t2b, i_, $k] = 𝔼[Subscript[α, i] Subscript[a, i] - Subscript[τ, i] γ Subscript[b, j],
      Subscript[ξ, i] Subscript[x, i] + Subscript[η, i] Subscript[y, i],
      e^(ϵ Subscript[τ,i] Subscript[a,i]) + O[ϵ]^($k+1)]];
  Subscript[t2b, i, $k])

Subscript[t2b, i_] := Subscript[t2b, i, $k]
```

In[•]:=
```
t2b_i,2
```

Out[•]=
$$\mathbb{E}\left[a_i\,\alpha_i - \gamma\,b_j\,\tau_i,\ y_i\,\eta_i + x_i\,\xi_i,\ 1 + a_i\,\tau_i\,\epsilon + \frac{1}{2}\,a_i^2\,\tau_i^2\,\epsilon^2 + O[\epsilon]^3\right]$$

In[•]:=
```
t2b_i,2
```

Out[•]=
$$\mathbb{E}\left[a_i\,\alpha_i - \gamma\,b_j\,\tau_i,\ y_i\,\eta_i + x_i\,\xi_i,\ 1 + a_i\,\tau_i\,\epsilon + \frac{1}{2}\,a_i^2\,\tau_i^2\,\epsilon^2 + O[\epsilon]^3\right]$$

In[•]:= $t2b_1$

Block: Local variable specification {1} contains 1, which is not a symbol or an assignment to a symbol.

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General: Further output of Block::lvsym will be suppressed during this calculation.

$RecursionLimit: Recursion depth of 1024 exceeded during evaluation of {Block::lvsym, Block::lvsym, Block::lvsym, General::stop}.

$RecursionLimit: Recursion depth of 1024 exceeded during evaluation of Message[Message::msgl, Hold[{Block::lvsym, Block::lvsym, Block::lvsym, General::stop}]].

$RecursionLimit: Recursion depth of 1024 exceeded during evaluation of {$RecursionLimit::reclim2}.

$RecursionLimit: Recursion depth of 1024 exceeded during evaluation of {OutputStream[Name: stdout Unique ID: 1]}.

General: Further output of $RecursionLimit::reclim2 will be suppressed during this calculation.

Out[•]= Hold[$t2b_{1,3}$]

In[•]:= **?? Subscript**

Subscript[x, y] is an object that formats as x_y.
Subscript[x, y_1, y_2, …] formats as $x_{y_1,y_2,\ldots}$. ≫

```
Attributes[Subscript] = {NHoldRest}

Subscript[t2b, i_, 2] = 𝔼[Subscript[a, i] Subscript[α, i] - γ Subscript[b, j] Subscript[τ, i],
  Subscript[y, i] Subscript[η, i] + Subscript[x, i] Subscript[ξ, i],
  1 + Subscript[a, i] Subscript[τ, i] ϵ + 1/2 Subscript[a, i]^2 Subscript[τ, i]^2 ϵ^2 + O[ϵ]^3]

Subscript[t2b, i_, $k_] := (Block[{i},
   Subscript[t2b, i_, $k] = 𝔼[Subscript[α, i] Subscript[a, i] - Subscript[τ, i] γ Subscript[b, j],
     Subscript[ξ, i] Subscript[x, i] + Subscript[η, i] Subscript[y, i],
     e^(ϵ Subscript[τ, i] Subscript[a, i]) + O[ϵ]^($k+1)]];
  Subscript[t2b, i, $k])

Subscript[t2b, i_] := Subscript[t2b, i, $k]
```