Pensieve header: The double and meta-double of the 2D pencil; continued pensieve://2017-05/.

```
SetDirectory["C:\\drorbn\\AcademicPensieve\\2017-04"];
Once[Get["UEA`"]]
```

UEA` does computations in general universal enveloping algebras and PBW algebras. It is in the public domain, available at http://drorbn.net/AcademicPensieve/Projects/UEA/. Dror Bar-Natan is committed to support it within reason until March 18, 2022. This is version 170423.

UEA` implements / extends $\{**, B, m, SetAlgebra, U, UB, UProducts, USimp, UU, \$Basis, \$PBWRule\}$.

UEA`SetAlgebra knows "sl2".

I hope to stick to $G = e^g$ and to $H = e^h$, where $[g, e] = \gamma\, e$ and $[h, f] = -\eta\, f$.

```
$Basis = {g, G, e, h, H, f}; $PBWRule = Thread[$Basis → Range@Length@$Basis];
B[g, e]  =  γ e; B[h, f]  =  -ηf;

With[{G = U₁[] + U₁[g] + 1/2 U₁[g, g]}, UB[G, U₁[e]]]
```

$$\gamma\, U_1[e] - \frac{1}{2}\gamma^2\, U_1[e] + \gamma\, U_1[g, e]$$