

The nilpotent part M of the Borel of the " $U_{\epsilon}[\mathfrak{sl}_3]$ " algebra illustrates a bug in the definition of the non-commutative multiplication $**$. *Mathematica* fails to simplify the highlighted expression during the evaluation, resulting in an infinite loop.

Initialization + DeclareAlgebra (as in Verification.nb with $k=1$)

Implementing M

QU

```
DeclareAlgebra[M, Generators → {X, Y, Z}, CentralS → {}];
B[Y_M, X_M] = -ϵ M@Z;
B[Z_M, X_M] = -ϵ M[X, X, Y];
B[Z_M, Y_M] = -ϵ M[X, Y, Y];
```

```
ϵ Y_M ** M[X, Y, Y]
```

```
$RecursionLimit::reclim : Recursion depth of 1024 exceeded. >>
```

```
$RecursionLimit::reclim : Recursion depth of 1024 exceeded. >>
```

```
ϵ (-ϵ M[Y, Y, Z] + (#1 ** M[Y, Y] &) [M[X, Y]])
```