

The nilpotent part M of the Borel of the "U_ε[sl₃]" 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[X_M, Y_M] = ε M@Z;
B[X_M, Z_M] = ε M[X, X, Y];
B[Y_M, Z_M] = ε M[X, Y, Y];
```

ε Y_M ** M[X, Y, Y]

```
$RecursionLimit::reclim : Recursion depth of 1024 exceeded. >>
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General::stop : Further output of $RecursionLimit::reclim will be suppressed during this calculation. >>
$IterationLimit::itlim : Iteration limit of 4096 exceeded. >>
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General::stop : Further output of $RecursionLimit::reclim will be suppressed during this calculation. >>
ε (-ε M[Y, Y, Z] + (≠1 ** M[Y, Y] &) [M[X, Y]])
```