

```

SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\WKO4"];
<< FreeLie.m;
<< AwCalculus.m;
$SeriesShowDegree = 4;

FreeLie` implements / extends
{*, +, **, $SeriesShowDegree, <>, ∫, ≡, ad, Ad, adSeries, AllCyclicWords,
  AllLyndonWords, AllWords, ASeries, AW, b, BCH, BooleanSequence, BracketForm, BS,
  CC, Crop, CW, CWS, CWSeries, D, Deg, DegreeScale, DerivationSeries, div, EulerE,
  Exp, InvertLieMorphism, j, J, JA, LieDerivation, LieMorphism, LieSeries, LS, LW,
  LyndonFactorization, New, RandomCWSeries, Randomizer, RandomLieSeries, RC, SeriesSolve,
  Support, tb, TopBracketForm, tr, UndeterminedCoefficients, Γ, ℓ, Λ, ħ, ↯, ↰}.

AwCalculus` implements / extends {*, **, E, ≡, dA, dc, deg,
  dm, dS, dΔ, dη, dσ, E1, Es, hA, hm, hS, hη, hσ, tA, tha, tm, tS, tσ, Γ, Λ}.

Rt±:(1|s) [a-, b-] := Et[<a → LS[0], b → LS[LW@a]>, CWS[0]];
Rt-:(1|s) [a-, b-] := Et[<a → LS[0], b → -LS[LW@a]>, CWS[0]];

{λ, ω} = List@@Rs+[x, z]
{<x → LS[0, 0, 0, 0, ...], z → LS[ $\overline{x}$ , 0, 0, 0, ...]>, CWS[0, 0, 0, 0, ...]}

λ // FullForm
AngleBracket[Rule[x, LieSeries[LieSeries$5]], Rule[z, LieSeries[LieSeries$6]]]

λ // hσ[{x, y, z} → {"1", "2", "3"}]
<1 → LS[0, 0, 0, 0, ...], 2 → LS[0, 0, 0, 0, ...], 3 → LS[0, 0, 0, 0, ...]>

λ // hσ[z, 3] // FullForm
AngleBracket[Rule[3, LieSeries[LieSeries$5]], Rule[x, LieSeries[LieSeries$5]]]

λz
LS[ $\overline{x}$ , 0, 0, 0, ...]

{λ1, ω1} = List@@Rs+[y, z]
{<y → LS[0, 0, 0, 0, ...], z → LS[ $\overline{y}$ , 0, 0, 0, ...]>, CWS[0, 0, 0, 0, ...]}

λ1 // hσ[{x, y, z} → {"1", "2", "3"}]
<1 → x, 2 → LS[0, 0, 0, 0, ...], 3 → LS[ $\overline{y}$ , 0, 0, 0, ...]>

```