

EXERCISES

- Given a graded vector space V , construct a canonical equivalence:

$$\mathrm{Sym}^2(V[1]) \simeq \Lambda^2(V)[1]$$

- Taken from Dev Sinha's paper *Koszul Duality in Algebraic Topology*:
Compute the Chevalley-Eilenberg cohomology of the graded Lie algebra with three generators x, y, z in degree three with the only relation being $[x, y] = [y, z]$.
- Construct a presentation of the Lie algebra obtained as the central extension (obtain from the Poincaré pairing) of the deRham cohomology of the genus 2 surface. Construct its corresponding Chevalley-Eilenberg complex, and use the weight filtration on the symmetric algebra to analyze its homology.