Homework 14.

Problem 1 – 15 points

Prove Lie operators identity:

$$:f:[g,h]=[:f:g,h]+[g,:f:h]$$

Problem 2 – 25 points

Prove for 1D case that $\exp(:f:)=\sum_{n=0}^{\infty}\frac{:f:^n}{n!}$ with $f=-\left(\frac{p^2}{2}+K_1\frac{x^2}{2}\right)\cdot s$ generates matrices for focusing and defocusing quadrupole. Consider also case of drift with $K_1=0$.