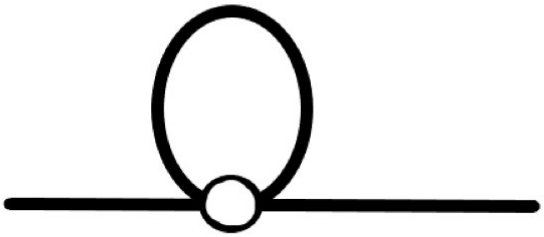
Fifth Week Exercise

Abhishek Daniel

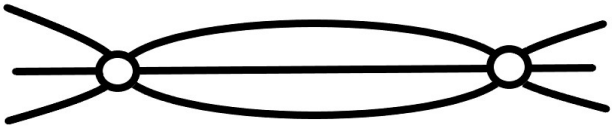
Exercise

Evaluate the symmetry factor for the following:

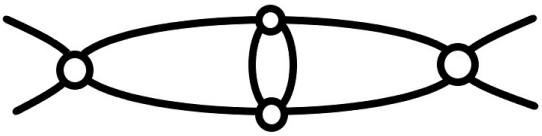
1. Symmetry factor = 1



2. Symmetry factor = 3

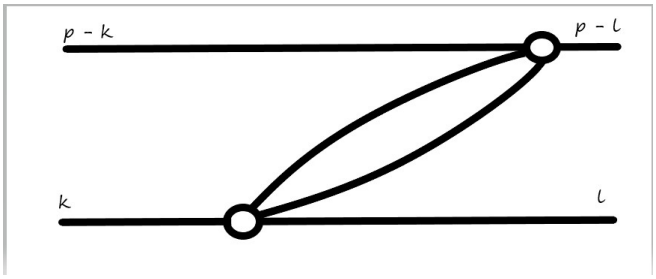


3. Symmetry factor = 6



Write down the mathematical expression for the following

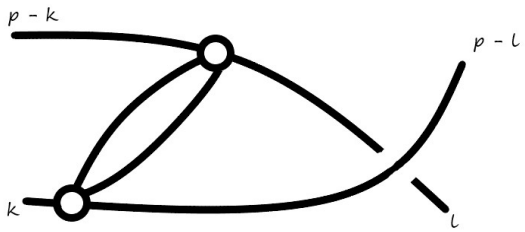
1. The Feynman diagram is given below,



Let the $(p-l)$ and l be the momenta of intermediate legs. Therefore we express the above diagram as

$$(-i\lambda).(-i\lambda)\frac{1}{2}\int \frac{d^4l}{(2\pi)^4}\left(\frac{i}{(p-l)^2-m^2+i\epsilon}\right)\left(\frac{i}{l^2-m^2+i\epsilon}\right)$$

2. The Feynman diagram is given below,



Let the $(p-l)$ and l be the momenta of intermediate legs. I referred a paper on scalar Yukawa theory where I find the legs are swapped only after the interaction places so there will be no changes on symmetry factor. Therefore we express the above diagram as

$$(-i\lambda).(-i\lambda)\frac{1}{2}\int \frac{d^4l}{(2\pi)^4}\left(\frac{i}{(p-l)^2-m^2+i\epsilon}\right)\left(\frac{i}{l^2-m^2+i\epsilon}\right)$$