

- both vertices give $\frac{1}{4!}$ ($\frac{1}{4!} \lambda g^4$)

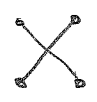
- $\exp(iS_I) = 1 + iS_I + \frac{(i)^2}{2!} S_I^2 + \dots$

was expanded to 2nd order to get λ^2 .

Thus, we get extra $\frac{1}{2!}$

\Rightarrow thus, overall $S = \frac{8 \cdot 3 \cdot 4 \cdot 3 \cdot 2}{(4!)^2 \cdot 2!} = \frac{1}{2}$

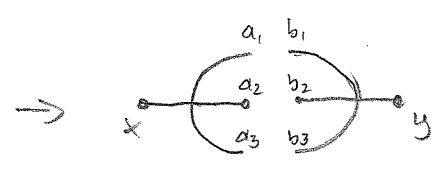
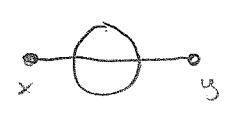
Examples:



$S = \frac{4 \cdot 3 \cdot 2 \cdot 1}{4! \cdot 1!} = 1$ as we got before



$S = \frac{8 \cdot 4 \cdot 3 \cdot 2 \cdot 3}{(4!)^2 \cdot 2!} = \frac{1}{2}$



$S = \frac{8 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{(4!)^2 \cdot 2!} = \frac{1}{3}$

(Note: The diagram above this equation has arrows pointing from labels x, y, a1, b1, a2, b2 to the corresponding vertices in the diagram.)



$\rightarrow X \quad S = \frac{3 \cdot 1}{4! \cdot 1!} = \frac{1}{8}$

Choose any leg, 3 options to connect to another.

• The factor $\frac{1}{4!}$ could as well be included in 2. However, this way is more customary. As we see, 4! is largely cancelled!

• For Amputated Green functions the external propagators are substituted by δ -functions (2.43); $G_F(x-y) \rightarrow \delta^{(4)}(x-y)$