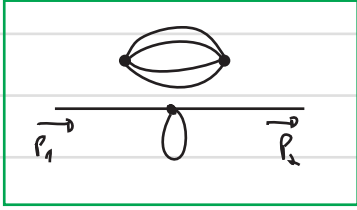
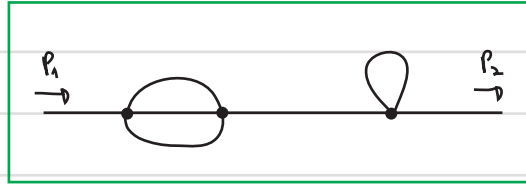


1

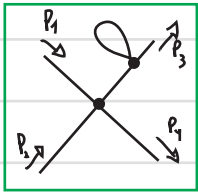
Use the Feynman rules of  $\lambda\phi^4$ , to obtain the expression of  $\langle P_j \dots P_m | P_i \dots P_n \rangle_{\text{in}}$  for the diagrams below:



(a)



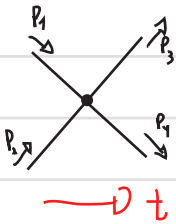
(b)



(c)

2

Get the total cross-section  $\sigma$ , of  $2 \rightarrow 2$  scattering in leading order (LO)  $\lambda\phi^4$ , which is given by the diagram below (assume the particle has mass  $m$ ):



→ t

(your answer should be in terms of  $E_{\text{CM}}$  and  $\lambda$ )