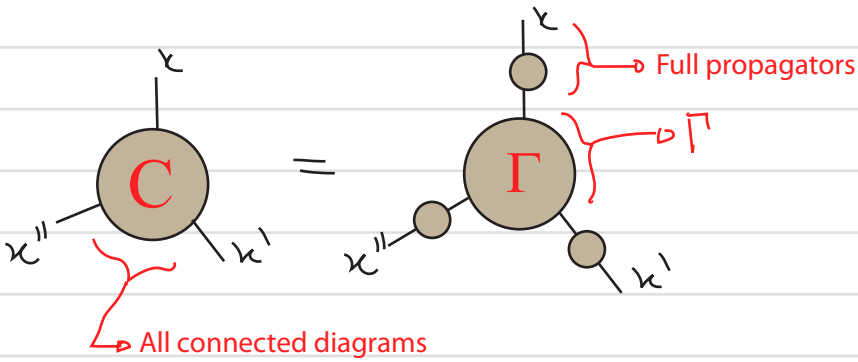
1 Show that:

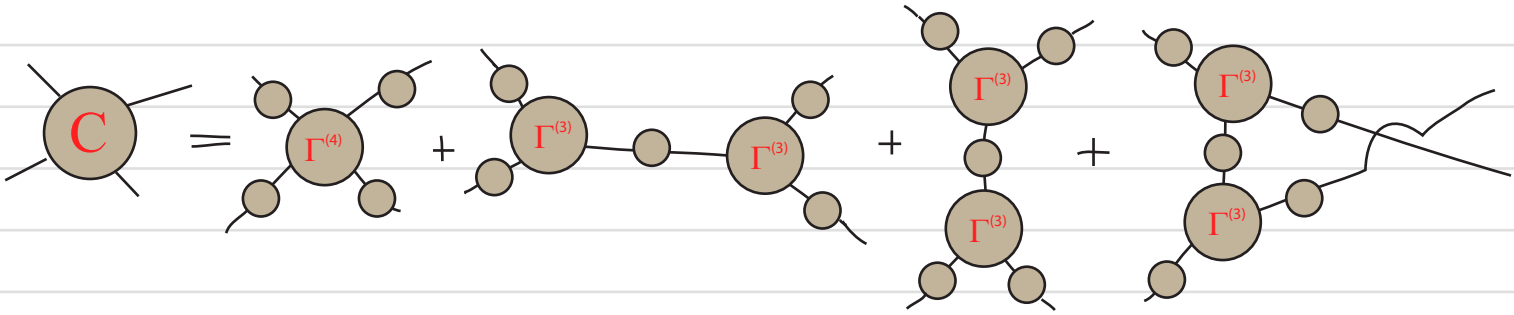
$$\frac{\delta^3 W[J]}{\delta J(x'')\delta J(x)\delta J(x')} \approx \int dz\, dz''\, dz'\, \Delta_F^c(x,z)\Delta_F^c(z'',x'')\Delta_F^c(x',z') \frac{\delta^3 \Gamma[\phi]}{\delta\phi_c(z'')\delta\phi_b(z)\delta\phi_a(z')}$$

(with a factor of ± i, depending on definitions and metric)

(note that this is a formal version of something easy to believe diagrammatically:)



Also, show (schematically no need to write every term and integral):



2 Let's continue working on the Lagrangian:

$$\mathcal{L} = \frac{1}{2}(\partial_\nu\phi)^2 - \frac{1}{2}m_{\phi 0}^2\phi^2 + \bar{\psi}(i\not{\partial} - m_{e0})\psi - ig_0\bar{\psi}\gamma^5\psi\phi$$

now define a physical coupling constant g and a counterterm δg, and write all the Feynman rules for this model.