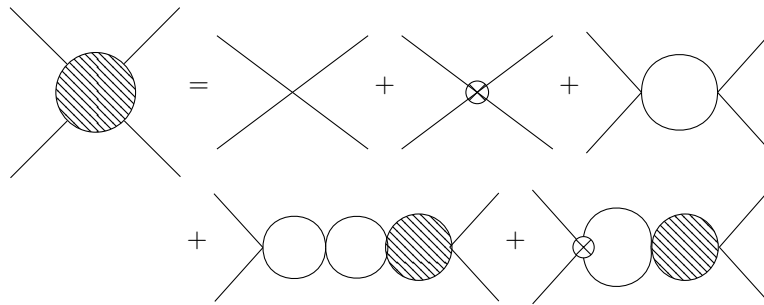


1 Perturbative view of integral equation

If we're to have the integral equation only with perturbative counterterms, for a start we can write



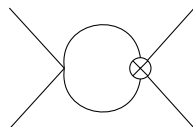
with one-loop counterterm.

The iterative form is

Equation (1) shows the iterative form of the integral equation. The left-hand side is a shaded circle with four external lines. The right-hand side is the sum of three terms: a cross, a circle with a cross, and a circle with four external lines. This is labeled (1).

Equation (2) shows the iterative form of the integral equation with two-loop counterterm. The left-hand side is a shaded circle with four external lines. The right-hand side is the sum of three terms: two circles in series, a circle with a cross, and three circles in series. This is labeled (2).

It'd appeared that we missed one diagram during the iteration:



If we add this one, the r.h.s. of the integral equation won't be finite again. Thus, only the counterterm from one loop is not sufficient enough to cancel all the divergences.