subtractions are severely restricted by the Ward identities, which render all divergences logarithmic and and relate the various divergent amplitudes. This is merely a reflection of the gauge invariance which limits the renormalized couplings to those displayed in the Lagrangian (2.5).[36]

The theory is then determined by specifying the subtraction constants at some convenient subtraction point. It is, of course, impossible to subtract at zero four momentum, due to the infrared singularities. One therefore performs the subtraction at an (arbitrary) Euclidean point $p^2 = -\mu^2$.

We define the vector wave function renormalization constant Z_3 in terms of the unrenormalized transverse vector propagator:

$$D^{tr}_{un}(k)^{ab}_{\mu\nu}\Big|_{k^2=-\mu^2} = \frac{i}{\mu^2} Z_3 \left(g_{\mu\nu} + \frac{k_\mu k_\nu}{\mu^2}\right) \delta_{ab} \tag{2.6}$$

the ghost wave function renormalization constant $\tilde{Z}_3$ in terms of the unrenormalized ghost propagator:

$$G^{ab}_{un}(-\mu^2) = -\frac{i}{\mu^2} \tilde{Z}_3 \delta_{ab} \tag{2.7}$$

the vector charge renormalization constant Z_1 in terms of the unrenormalized vector three-point vertex:

$$\Gamma^{abc}_{un}(p,q,r)_{\mu\nu\lambda}\Big|_{p^2=q^2=r^2=-\mu^2} = Z_1^{-1}\, \Gamma^{abc}_{BARE}(p,q,r)_{\mu\nu\lambda} \tag{2.8}$$

and the ghost-vector charge renormalization constant $\tilde{Z}_1$ in terms of the unrenormalized ghost-vector three point vertex: