In particular the transverse part of the vector meson propagator behaves like:

$$D^{tr}(k)^{ab}_{\mu\nu} \xrightarrow[k^2\to-\infty]{} \delta_{ab}(g_{\mu\nu} - \frac{k_\mu k_\nu}{k^2} (\ell n k^2)^{c_o/b_o} I_2 \ . \tag{4.18}$$

To calculate the asymptotic behavior of Green's functions involving fermions we require the anamalous dimension of the fermion field γ_F. This is readily calculated (except for group theoretical factors it is the same as in QED):

$$\gamma_F(g,\alpha) = g^2 f_o + \ldots = \frac{g^2}{16\pi^2} \alpha\ C_2(R) + \ldots \tag{4.19}$$

Thus the fermion propagator behaves for large momenta according to:

$$S_F\ (p) \xrightarrow[p^2\to-\infty]{} \frac{1}{\not p} (\ell n p^2)^{f_o/b_o} \tag{4.20}$$

It is a important feature of asymptotically free theories that the Greens functions are not strictly given by their free field theory expression for infinite momenta, due to the presence of the logarithmic term in (4.16). These arise because the anomalous dimensions vanish like $\bar{g}^2$, and $\bar{g}^2$ vanishes only logarithmically as $\lambda\to\infty$. This, of course, is a consequence of the fact that $\beta(g^2)$ has a double zero at $g^2 = 0$. These logarithmic corrections to free field behavior are calculable and independent of the coupling constants. They can be computed by calculating the relevant anomalous dimension to second order. The above Green's functions are of little physical interest due to their gauge dependence. However, as we shall see shortly, the physically interesting Green's functions of gauge independent