g_1 and IR stable fixed points at g_1 or zero respectively. These would provide interesting theoretical models in which both the ultraviolet and the infrared asymptotic behavior would be calculable!

The physical consequences of asymptotic freedom will be explored in the following section and in a subsequent paper. It is clear, from the discussion in II, that the ultraviolet asymptotic behavior of all Green functions can be calculated. Thus the n-vector meson 1PI will behave, for large Euclidean momenta according to Eq. 2.29. If we define (we shall work in Landau Gauge):

$$\gamma_V(g) = c_o g^2 + c_1 g^4 + \ldots \tag{4.14}$$

where

$$c_o = -\frac{g^2}{16\pi^2}\left[\frac{13}{3} C_2(G) - \frac{8}{3} T(R)\right], \tag{4.15}$$

then:

$$\Gamma^{(n)}(\lambda p_1,\ldots,\lambda p_n;g,\mu) \xrightarrow[\lambda\to\infty]{} \lambda^{4-n}(\ell n\lambda)^{-\frac{nc_o}{b_o}} I_n$$
$$\times\left\{\Gamma^{(n)}(p_1,\ldots,p_n;0,\mu) + \Gamma^{(n)}(p_1,\ldots p_n;\frac{1}{b_o \ell n\lambda},\mu) + O\left(\frac{\ell n\ell n\lambda}{\ell n\lambda^2}\right)\right\} \tag{4.16}$$

where:

$$I_n = \exp -n\int_o^t dx\,\{\gamma_V\left[\bar{g}(x,g)\right] - c_o\bar{g}^2\} \xrightarrow[\lambda\to\infty]{} \text{const.} + O\left(\frac{1}{\ell n\lambda}\right). \tag{4.17}$$