We note that $\bar{\lambda}$ must be of order $\bar{g}^2$, for if it were larger then, since $A > 0$, the theory would not be asymptotically free. The coupling α satisfies:

$$\frac{d\alpha}{dt} = \bar{g}^2 \left[A\alpha^2 + B\alpha + C\right] \tag{6.11}$$

where

$$B = B' + b_o. \tag{6.12}$$

The fixed points of (6.11) will be given by the zeroes of the quadratic form. These will be real and positive if:

$$-\sqrt{4AC} < B < 0 \tag{6.13}$$

When this condition is satisfied (A and C are always positive) then there will exist two fixed points α_1 and α_2. If the coupling constant $\lambda = \alpha(o)g^2$ is chosen so that:

$$\alpha_1 = \frac{1}{2A}\left[-B-\sqrt{B^2-4AC}\right] < \alpha(o) < \alpha_2 = \frac{1}{2A}\left[-B+\sqrt{B^2-4AC}\right] \tag{6.14}$$

we will be driven to the value $\bar{\alpha} = \alpha_1$ as $t\to\infty$. In other words α_1 is a UV stable fixed point. Equation 6.11 can easily be solved by quadratures:

$$\int_{\alpha}^{\bar{\alpha}(t)} \frac{dx}{Ax^2 + Bx + C} = \int_o^t dt \quad \frac{g^2}{1 + b_o g^2 t} \tag{6.15}$$

For large t we have that:

$$\bar{\alpha}(t) - \alpha_1 \xrightarrow[t\to\infty]{} t^{-\frac{A(\alpha_2 - \alpha_1)}{b_o}}, \tag{6.16}$$

and since $\bar{g}^2 \simeq \frac{1}{t}$, $\bar{\lambda}(t)$ will approach zero like $\frac{1}{t}$.