Non-linear equation

Although non-linear differential equations are in general very difficult to solve, there is one almost obvious case where the solution is easy: if the generation rate $g(t)$ is very large and then shuts off, and if $n \gg n_o + p_o$, the equation becomes $\dfrac{dn}{dt} \approx -K(T)\, n^2$ or, with

$$K(T) = \frac{1}{(n_o + p_o)\tau_o}\;,\quad \frac{dn}{dt} \approx -\frac{n^2}{(n_o + p_o)\tau_o}\;.$$ This is easily integrated to give

$$\frac{1}{n(t)} - \frac{1}{n(0)} = \frac{t}{(n_o + p_o)\tau_o}\;,\quad \text{or, re-arranging, } n(t) = \frac{n(0)\,(n_o + p_o)\,\tau_o}{n(0)\,t + (n_o + p_o)\,\tau_o}\,\text{which, for}$$

large values of t, decreases linearly with t.