The asymptotic behavior of the so-called effective mass $m_{\text{eff}}$ of the Nelson model in the scalar quantum field theory with the space dimension $d \geq 3$ is considered. The Nelson model is defined as a self-adjoint operator by introducing ultraviolet cutoff $\Lambda > 0$. Let $\alpha \in \mathbb{R}$ be a coupling constant. It is shown that for sufficiently small $|\alpha|$, 

$$m_{\text{eff}}/m = 1 + \sum_{n=1}^{\infty} a_n(\Lambda) \alpha^{2n},$$

where $m$ denotes a bare mass. It is shown that for $d \leq 2$,

$$\limsup_{\Lambda \to \infty} |a_n(\Lambda)| < \infty,$$

and for $d = 3$,

$$\lim_{\Lambda \to \infty} |a_n(\Lambda)|/(\log \Lambda)^{n-1} < \infty$$

holds. (Received September 16, 2014)