Voltage at time t is

$$V=\sum_{j=1}^{N}\frac{QG}{t_0}(u(t-t_j)-u(t-t_0-t_j))$$

$$Q=q\cdot\varepsilon_j\cdot\sqrt{T/N}\qquad ...\varepsilon_j \text{ is } \pm 1 \text{ random}$$

This process does not depend on time therefore $t\to 0$.

This is called a stationary process in statistics. The mean and variance should be independent of time. also $(-t_j\to t_j)$

As $N\to\infty$, $V\to 0$, but there should be fluctuations according to

$$\sigma_V^2=\frac{q^2G^2}{t_0^2}\frac{T}{N}\sum_{j=1}^{N}\varepsilon_j^2\left[u(t_j)-u(t_j-t_0)\right]^2 ....\varepsilon_j^2\to 1$$

Given t_j has a rate of N/T, the average number above is $N\times\frac{t_0}{T}$....

$$\sigma_V^2=\frac{q^2G^2}{t_0^2}\frac{T}{N}\times N\times\frac{t_0}{T}=\frac{q^2G^2}{t_0}.....\sigma_V=\frac{qG}{\sqrt{t_0}}$$