

Xavier Initializer in KB2E TransE

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We draw the sample x using *randn* function, $x \sim f_X(x)$, and $F_X(x)$ is the c.d.f.

$$F_X(x) = f_X(x) * dx \quad (1)$$

$U_X(x)$ is the uniform distribution (p.d.f). In this case, $U_X(x) = \frac{1}{2\epsilon}$, $\epsilon = \frac{6}{\sqrt{n}}$.

$$F_X(x) = U_X(x) * dx * e^{-\frac{(x-\mu)^2}{2\sigma^2}} \quad (2)$$

$$= \frac{1}{2 * \frac{6}{\sqrt{n}}} * e^{-\frac{(x-\mu)^2}{2\sigma^2}} * dx \quad (3)$$

$$= \frac{\sqrt{n}}{12} * e^{-\frac{(x-\mu)^2}{2\sigma^2}} * dx \quad (4)$$

So,

$$f_X(x) = \frac{\sqrt{n}}{12} * e^{-\frac{(x-\mu)^2}{2\sigma^2}} \quad (5)$$

, where $\sigma^2 = \frac{1}{n}$, $\mu = 0$.