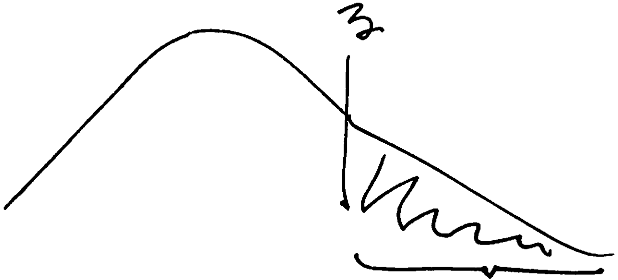
P-values are uniformly distributed under the Null.



$$\varphi(z) = P(Z > z)$$

* Uniform CDF is $P(U < u) = u$

* $P(\varphi(Z) < \varphi(z))$

$$= P(Z > z) = \varphi(z)$$

$$\Rightarrow \varphi(z) \sim \text{Uniform.}$$