Definition 11.19 (Gaussian Channel) A Gaussian channel with noise energy N is a continuous channel with the following two equivalent specifications:

1. $f(y|x) = \frac{1}{\sqrt{2\pi N}} e^{-\frac{(y-x)^2}{2N}}$
2. $Z \sim \mathcal{N}(0, N)$ and $\alpha(X, Z) = X + Z$.

Definition 11.20 (Memoryless Gaussian Channel) A memoryless Gaussian channel with noise power N and input power constraint P is a memoryless continuous channel with the generic continuous channel being the Gaussian channel with noise energy N. The input power constraint P refers to the input constraint (κ, P) with $\kappa(x) = x^2$.