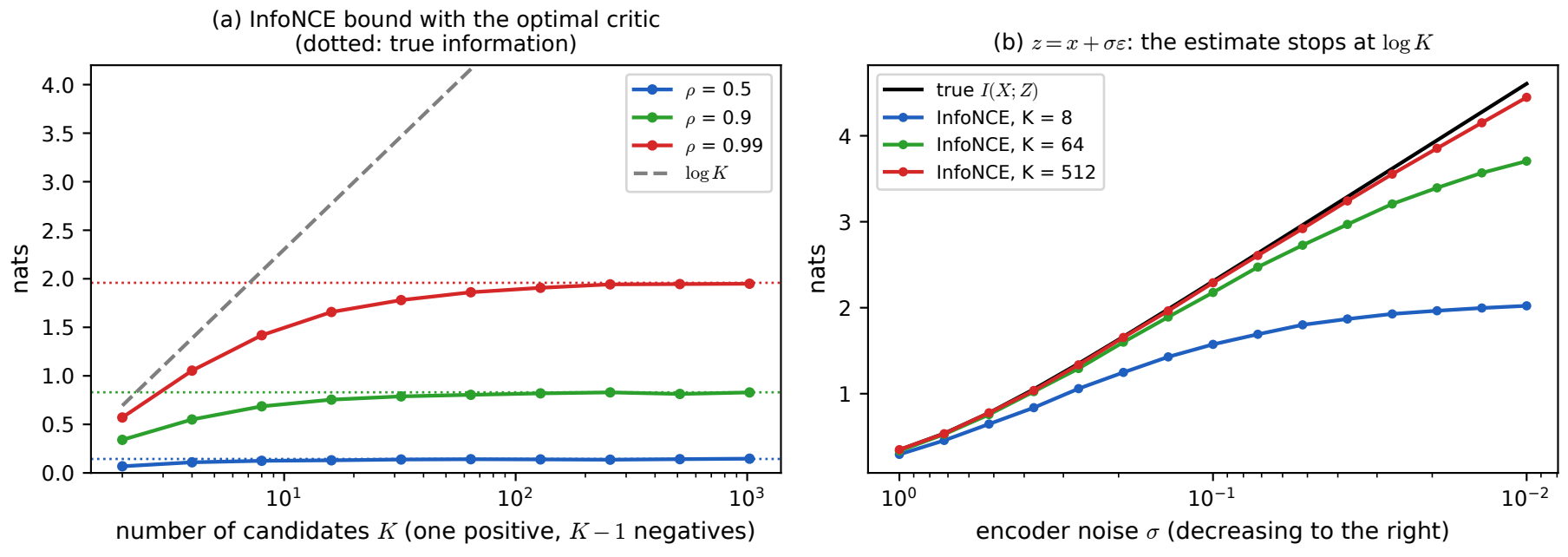

(a) InfoNCE bound with the optimal critic
(dotted: true information)
nats
number of candidates K (one positive, $K-1$ negatives)
ρ = 0.5
ρ = 0.9
ρ = 0.99
$\log K$
(b) $z = x + \sigma\varepsilon$: the estimate stops at $\log K$
nats
encoder noise σ (decreasing to the right)
true $I(X;Z)$
InfoNCE, K = 8
InfoNCE, K = 64
InfoNCE, K = 512