Journal of Spring 2015

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April 24, 2015

Contents

1 Adding Quantization Noise: Theoretical

1.1 Model of Summer 2014:

$$X(n+1) = AX(n) + W(n) + U(n)$$
$$X(0) \sim N(0,1)$$
$$Y(n) = \gamma^p[Q(x(n)) + v(n)] = \gamma^p[c(n)x(n) + v(n)]$$
$$C(n) \sim N(1,1)$$
$$\gamma^p = Ber(1 - 2^{-k})$$

$$U(n) = \begin{cases} L[X(n)|Y(n)] & : n \equiv 0 \text{ mod D} \\ 0 & : \text{else} \end{cases}$$

Produced this curve:

1.2 Model of 2015-03-04:

$$X(n+1) = AX(n) + W(n) + U(n)$$
$$X(0) \sim N(0,1)$$
$$Y(n) = \gamma^p[Q(x(n)) + v(n)] = \gamma^p[c(n)x(n) + v(n)]$$
$$C(n) \sim N(1, 2^{-2R})$$
$$\gamma^p = Ber(1 - 2^{-(msg-R)})$$

Note: γ^p = probability makes it through and is successfully decoded

Current parameters:

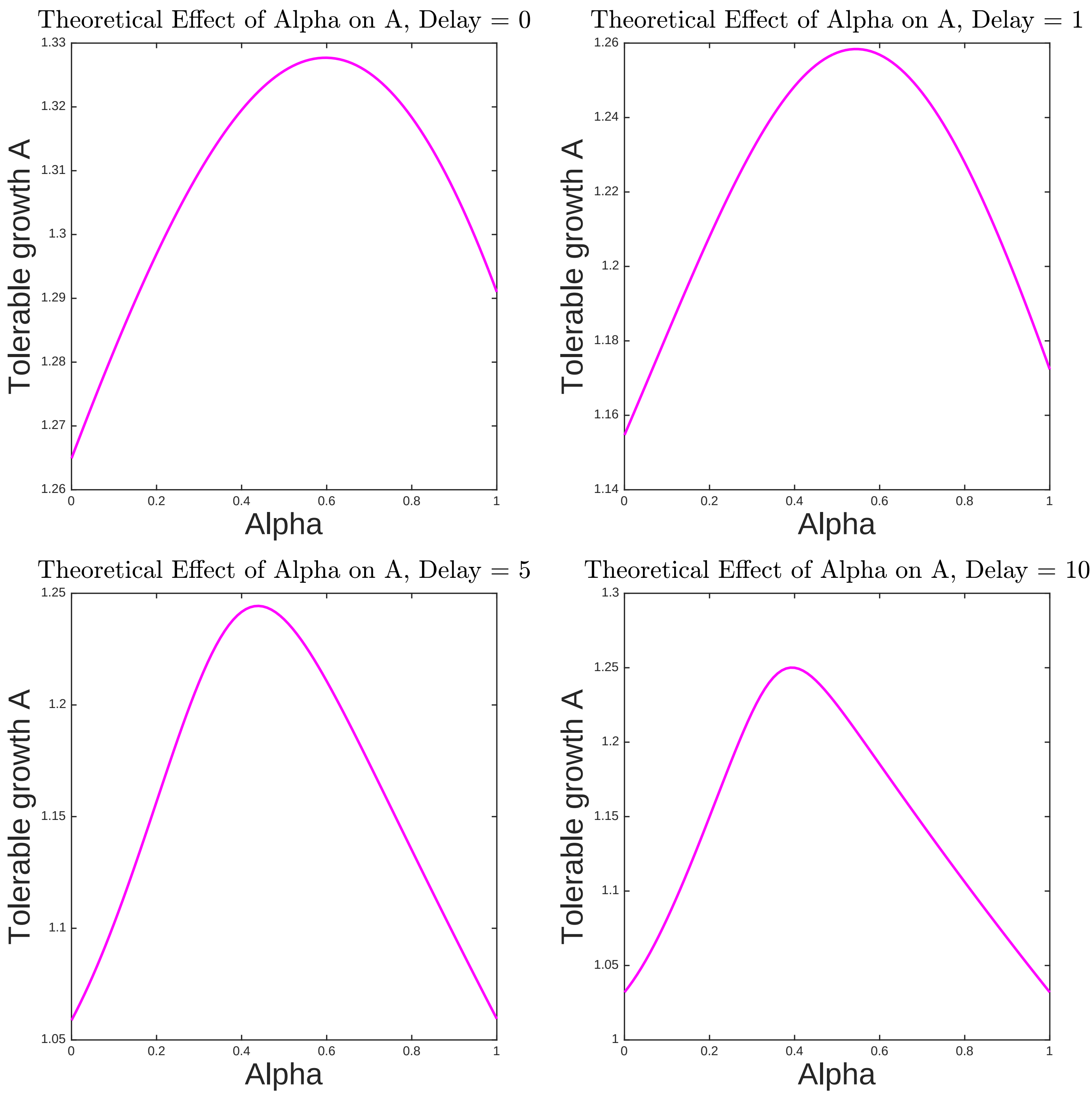
- $R = \alpha * msg$ = number of bits of information in code
- D delay
- β = rate of information through channel

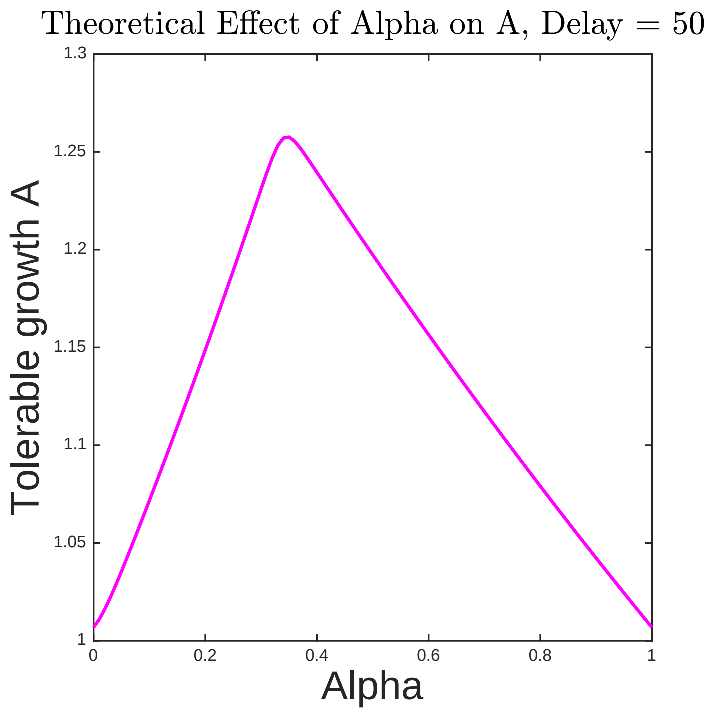
We can recreate the summer plot by setting $\beta = 1$ and $\alpha = 0 \rightarrow R = 0$. This essentially means we need to drop the entire packet (all bits) for it to count as a drop. In the new plot, we have less we can drop because we want to make sure the information can be decoded, so we can only drop redundant bits.

Note: If R = msg, that is we don't send any redundancy, we automatically guarantee our packet will be dropped!!

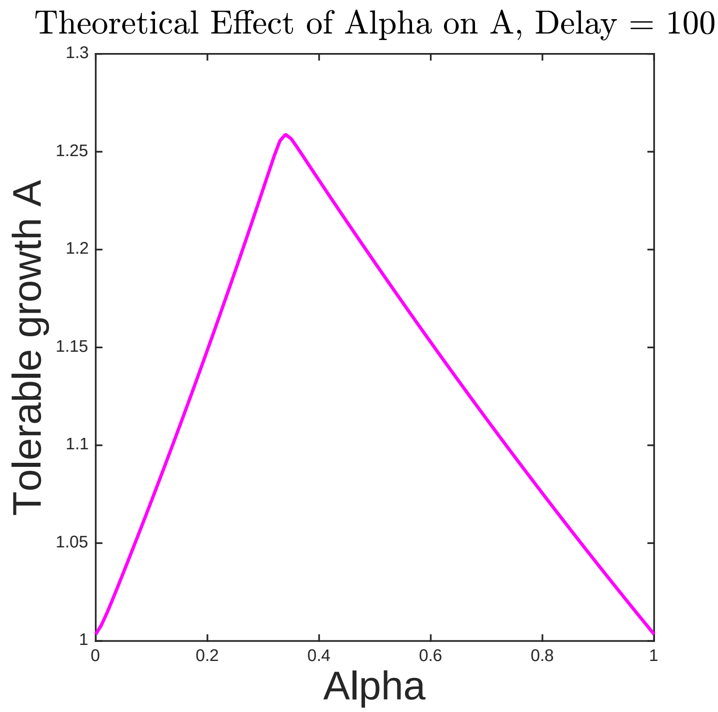
2 Empirical Support of Theoretical Curves

3 2015-04-24 Plotting Alpha vs A





Theoretical Effect of Alpha on A, Delay = 50
Tolerable growth A
Alpha



Theoretical Effect of Alpha on A, Delay = 100
Tolerable growth A
Alpha