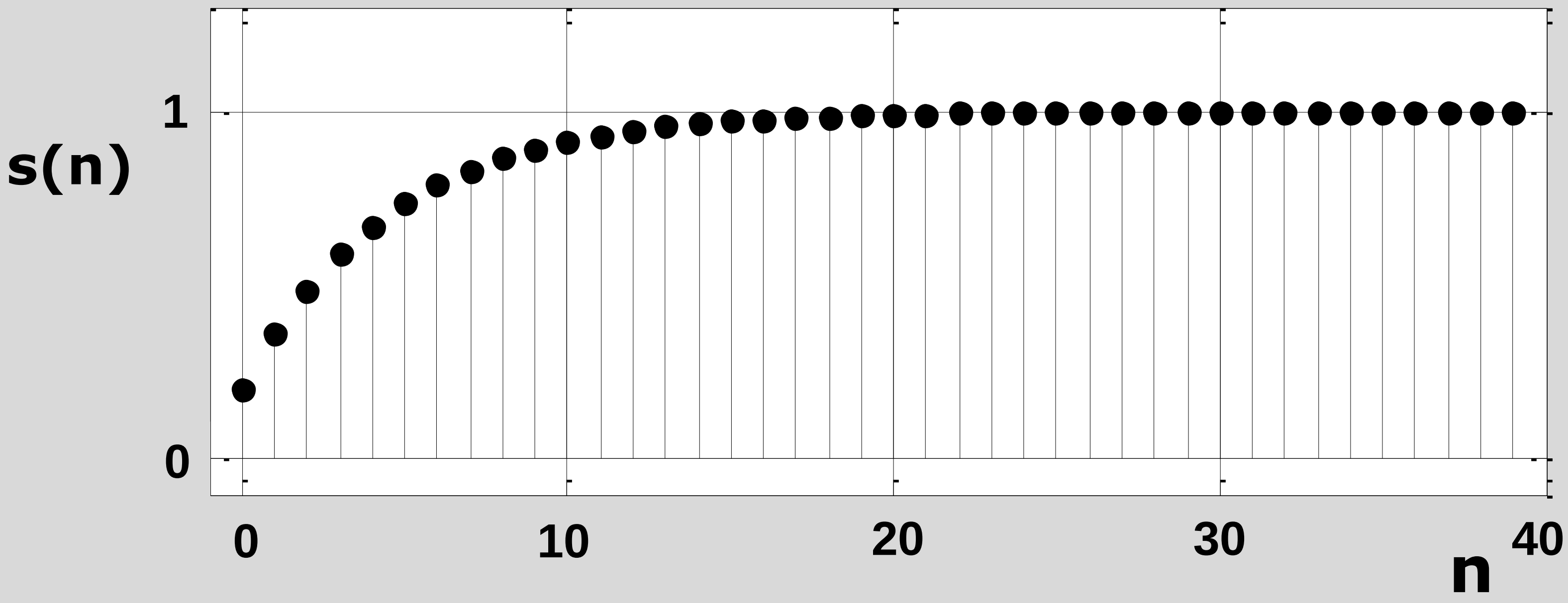
Modeling the Channel

Exponential Step Response

- Changes in amplitude (k)
- Blurring of transitions (a)

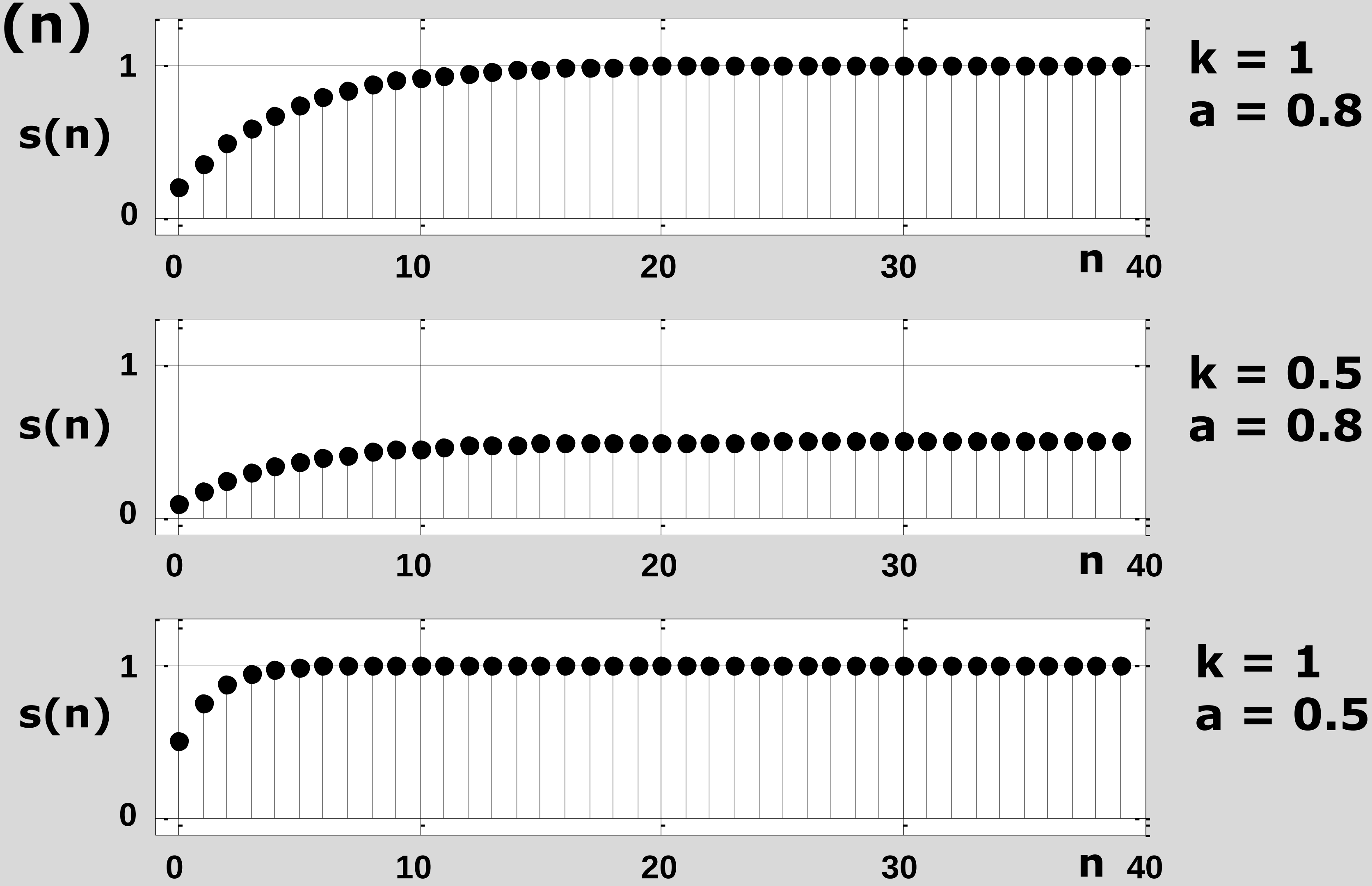
$$s(n) = k(1 - a^{n+1})u(n)$$



$k = 1$
$a = 0.8$

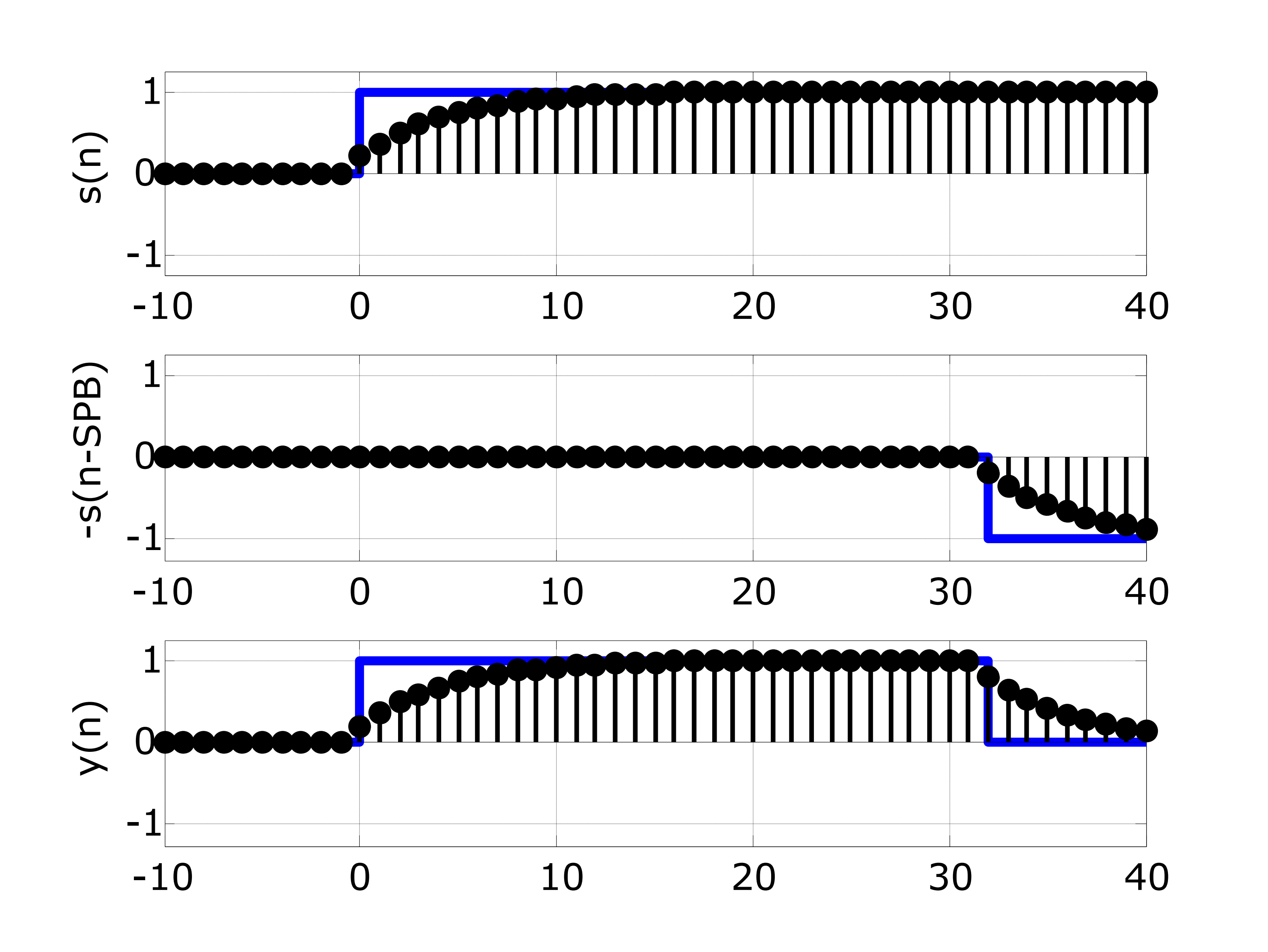
Different Parameter Settings

$$s(n) = k(1 - a^{n+1})u(n)$$



Response to single bit (bit time=32 SPB)

s(n) = Exponential approach,
a = 0.8
k = 1

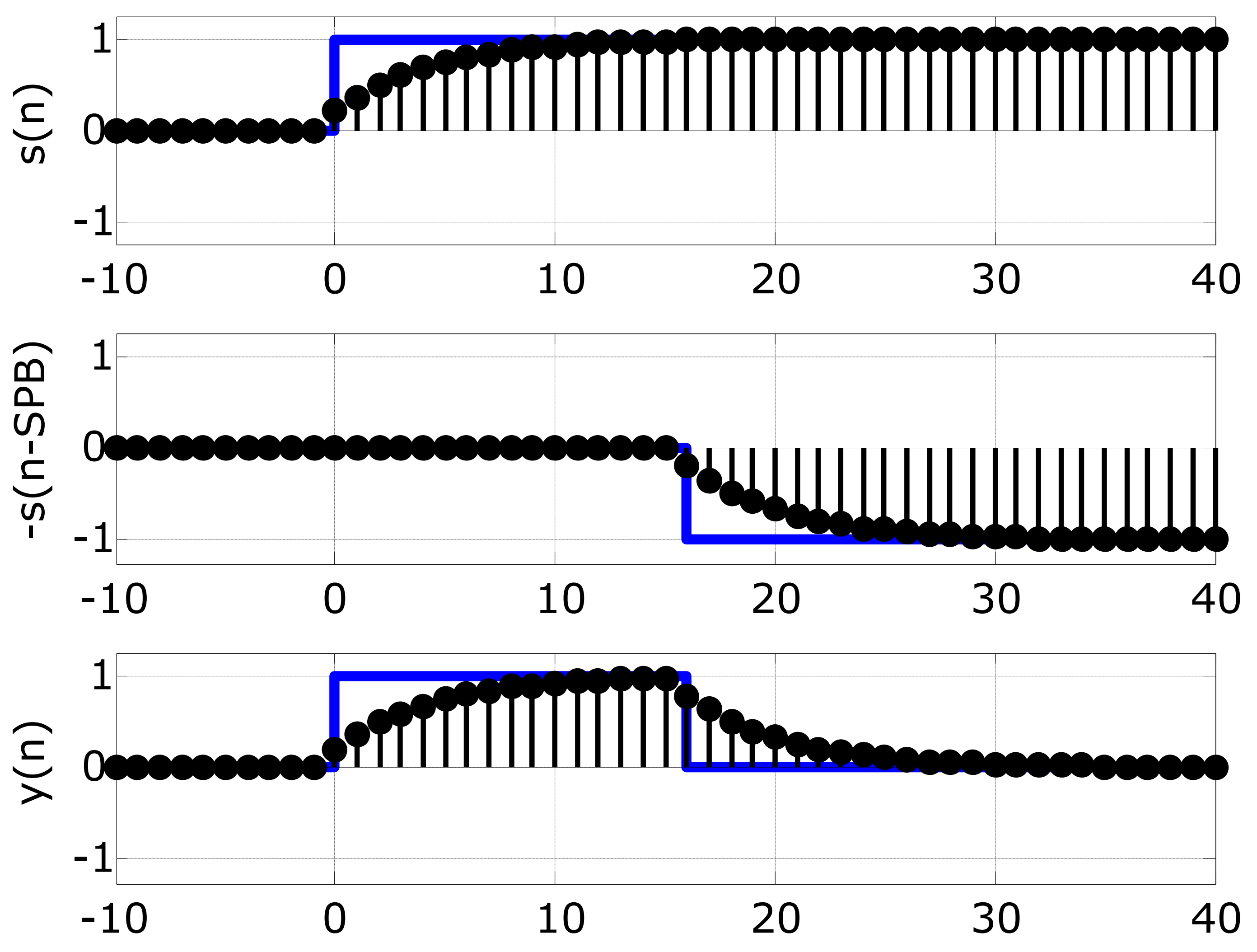


Blue = input
Black = output

Response to single bit (bit time=16 SPB)

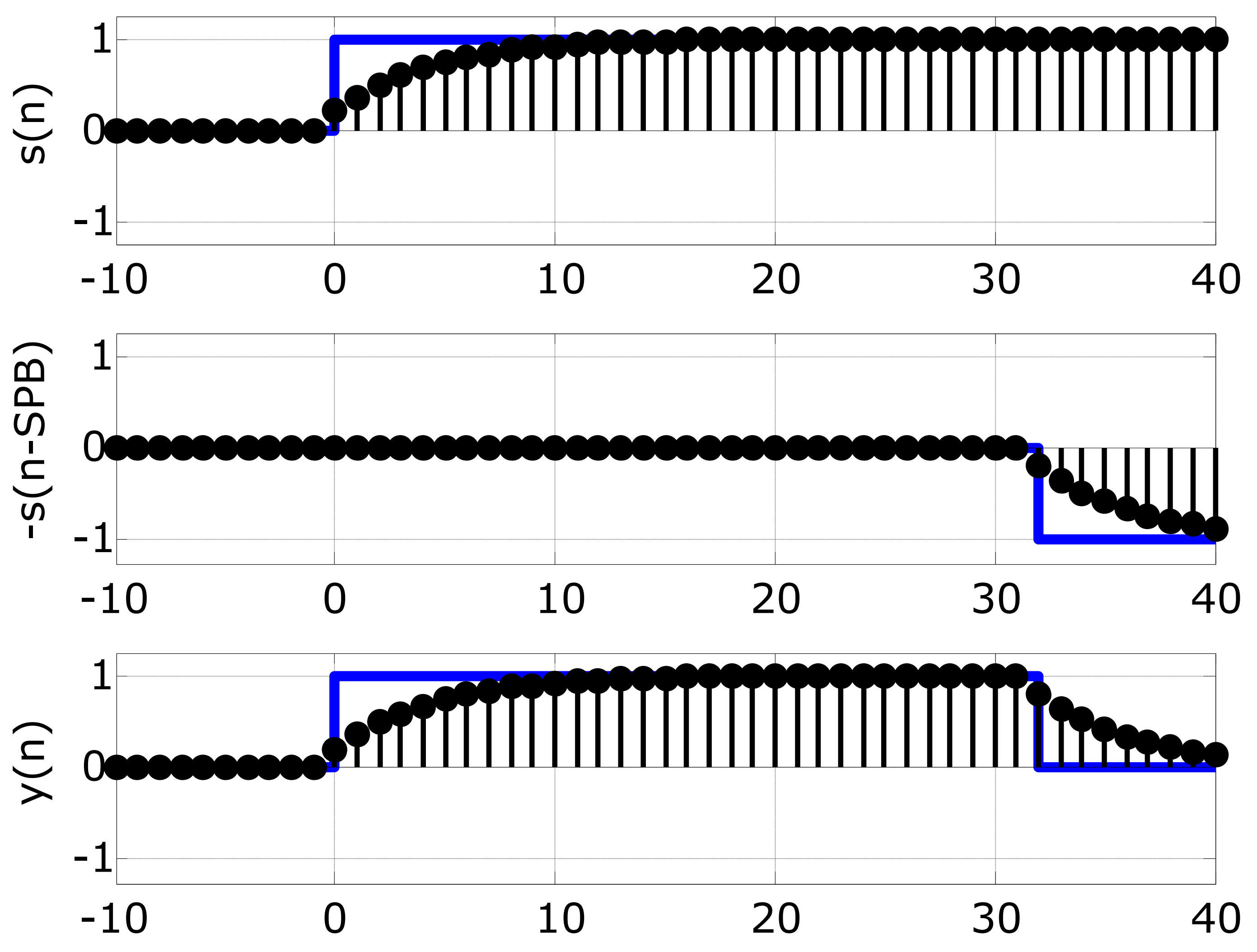
s(n) = Exponential approach,
a = 0.8
k = 1

Blue = input
Black = output



Response to single bit (bit time=32 SPB)

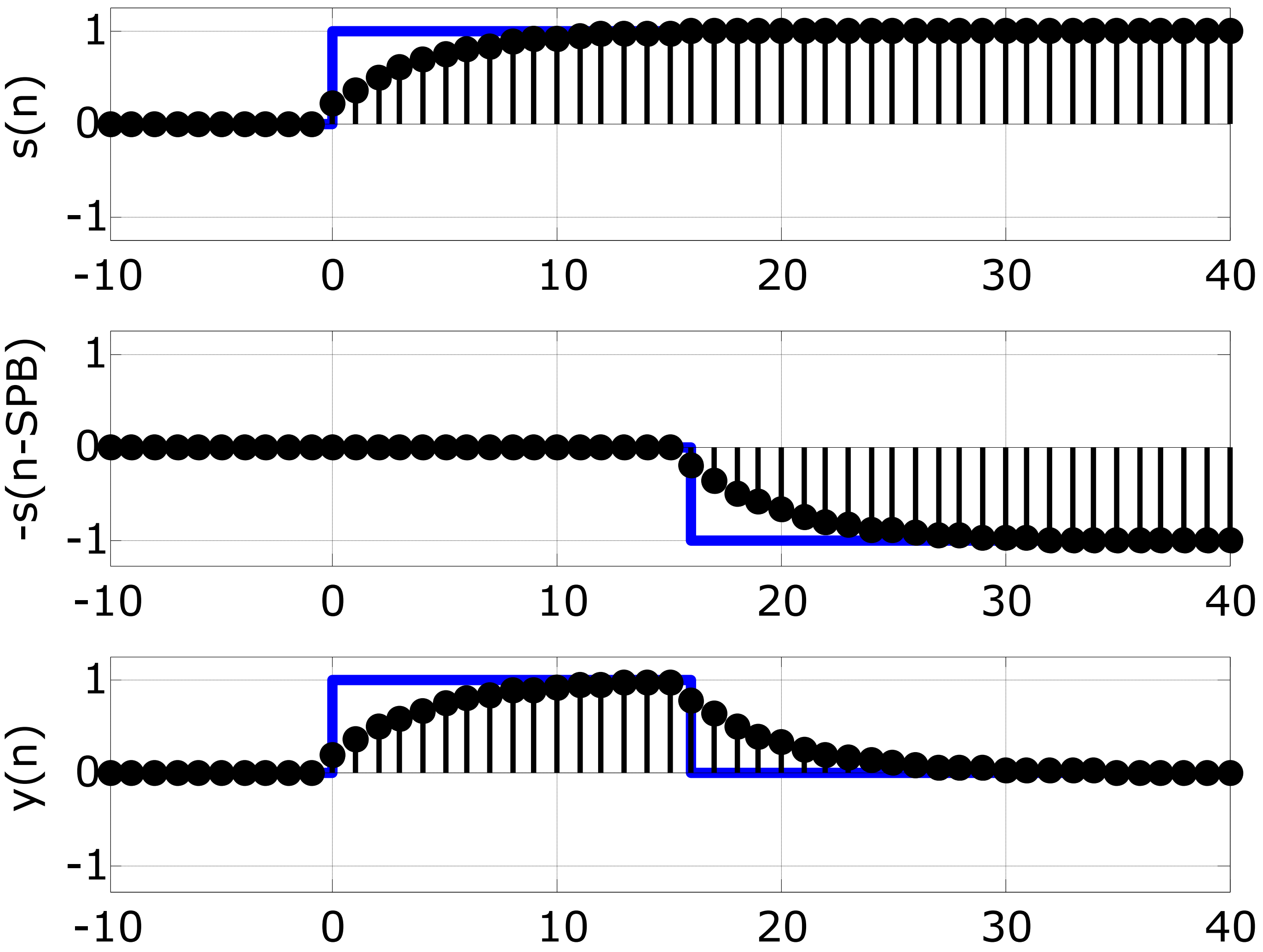
s(n) = Exponential approach,
a = 0.8
k = 1



Blue = input
Black = output

Response to single bit (bit time=16 SPB)

s(n) = Exponential approach,
a = 0.8
k = 1



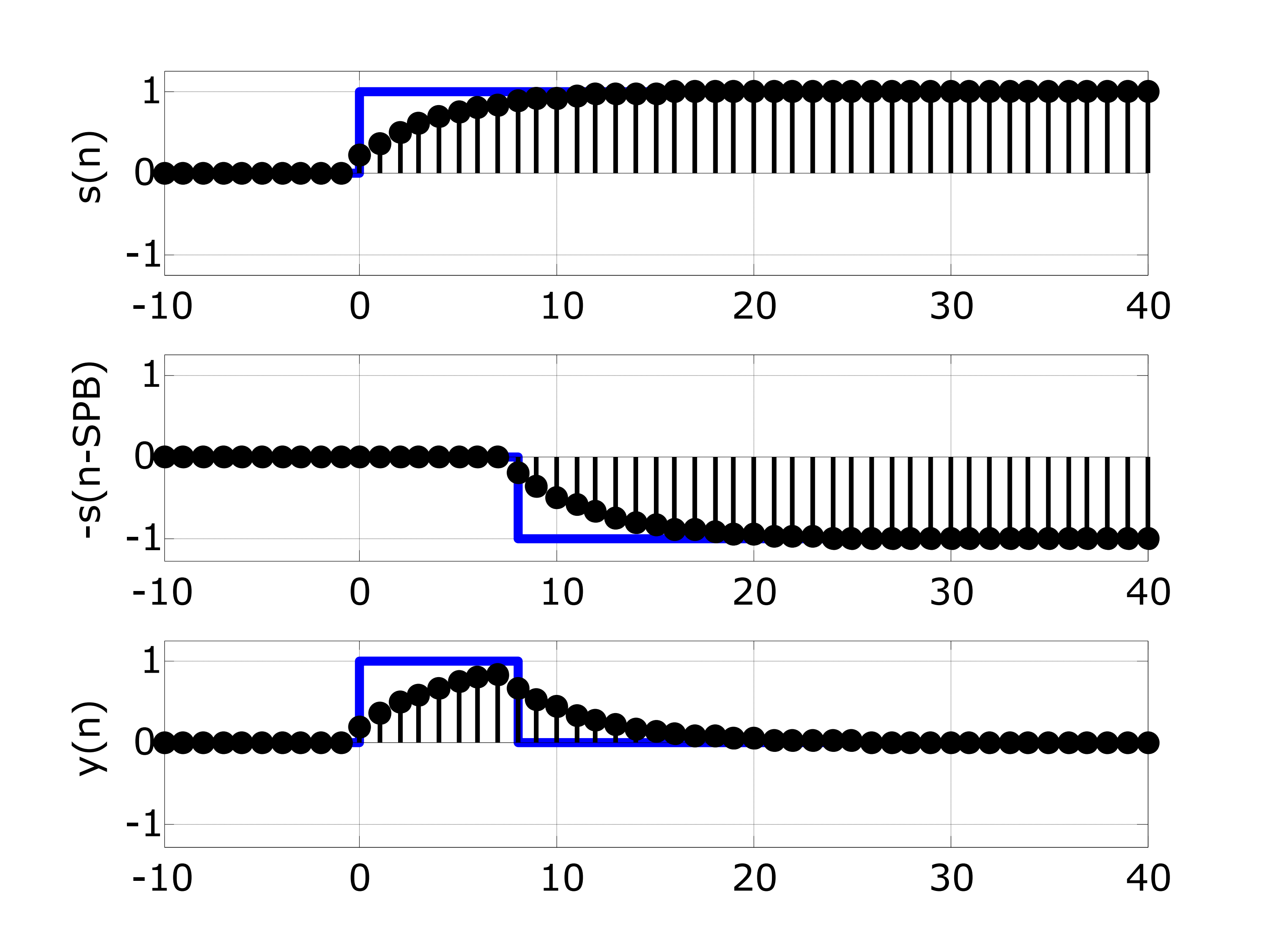
Blue = input
Black = output

Response to single bit (bit time=8 SPB)

s(n) = Exponential approach,

a = 0.8

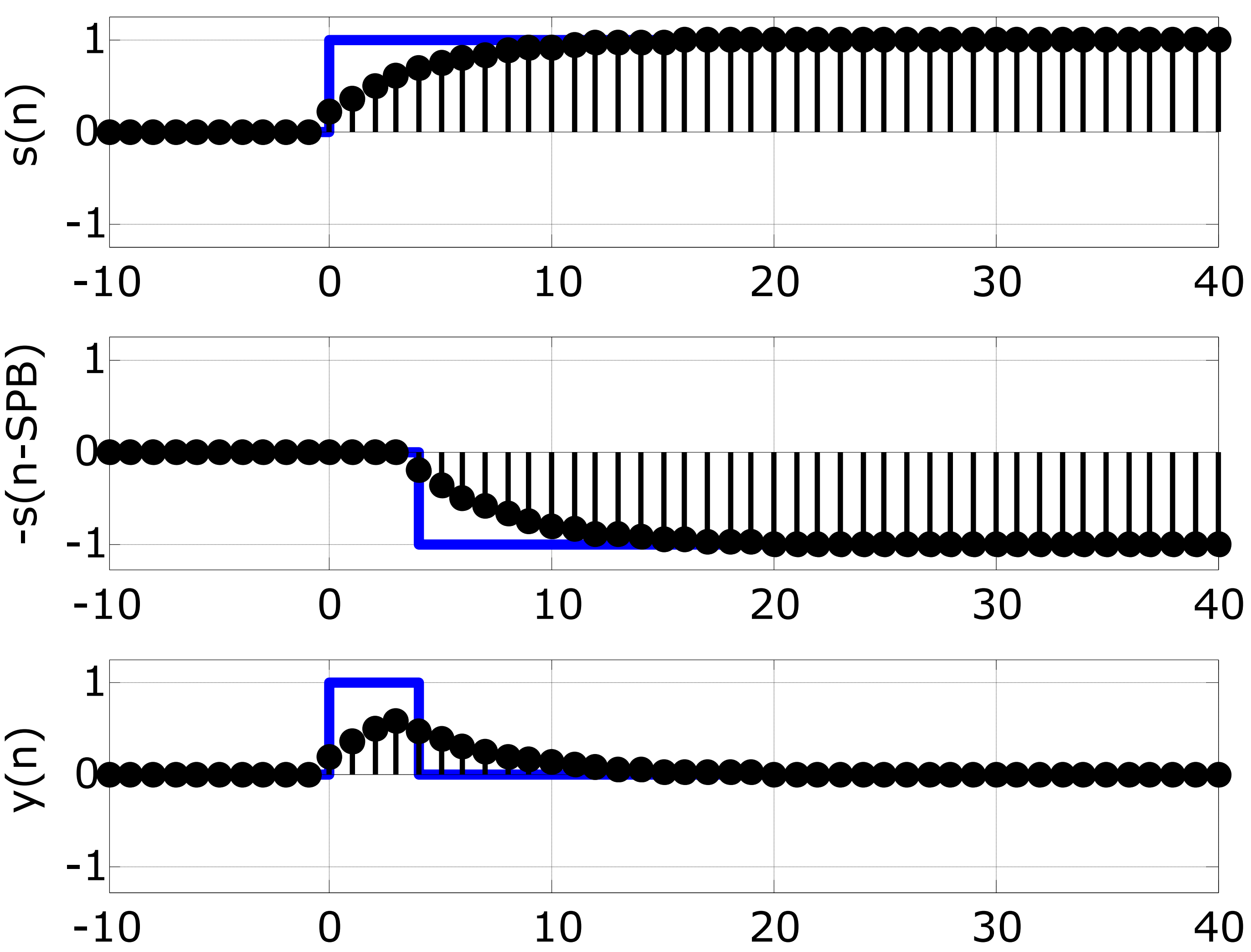
k = 1



Blue = input
Black = output

Response to single bit (bit time=4 SPB)

s(n) = Exponential approach,
  a = 0.8
  k = 1



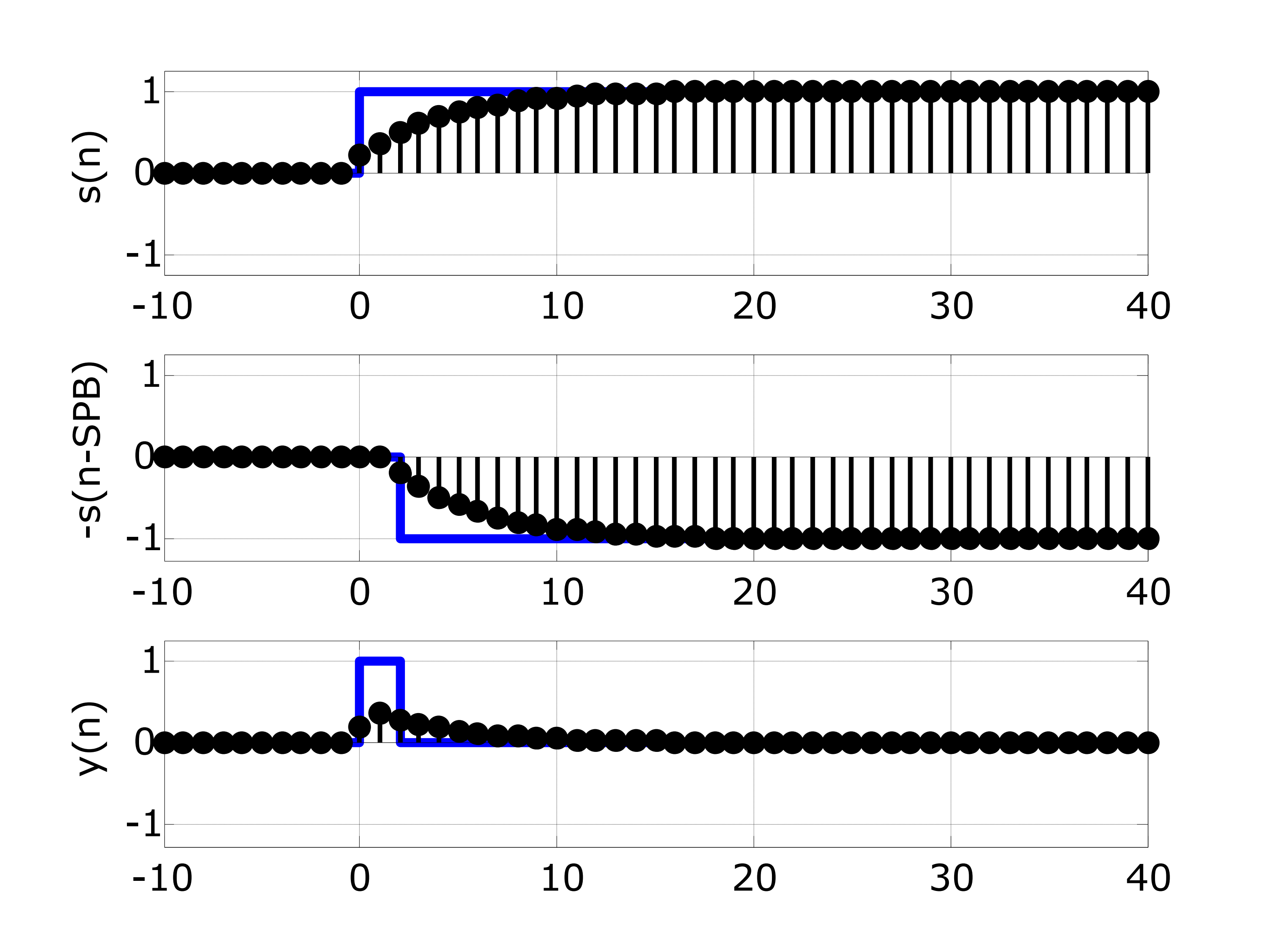
Blue = input
Black = output

Response to single bit (bit time=2 SPB)

s(n) = Exponential approach,

a = 0.8

k = 1



Blue = input

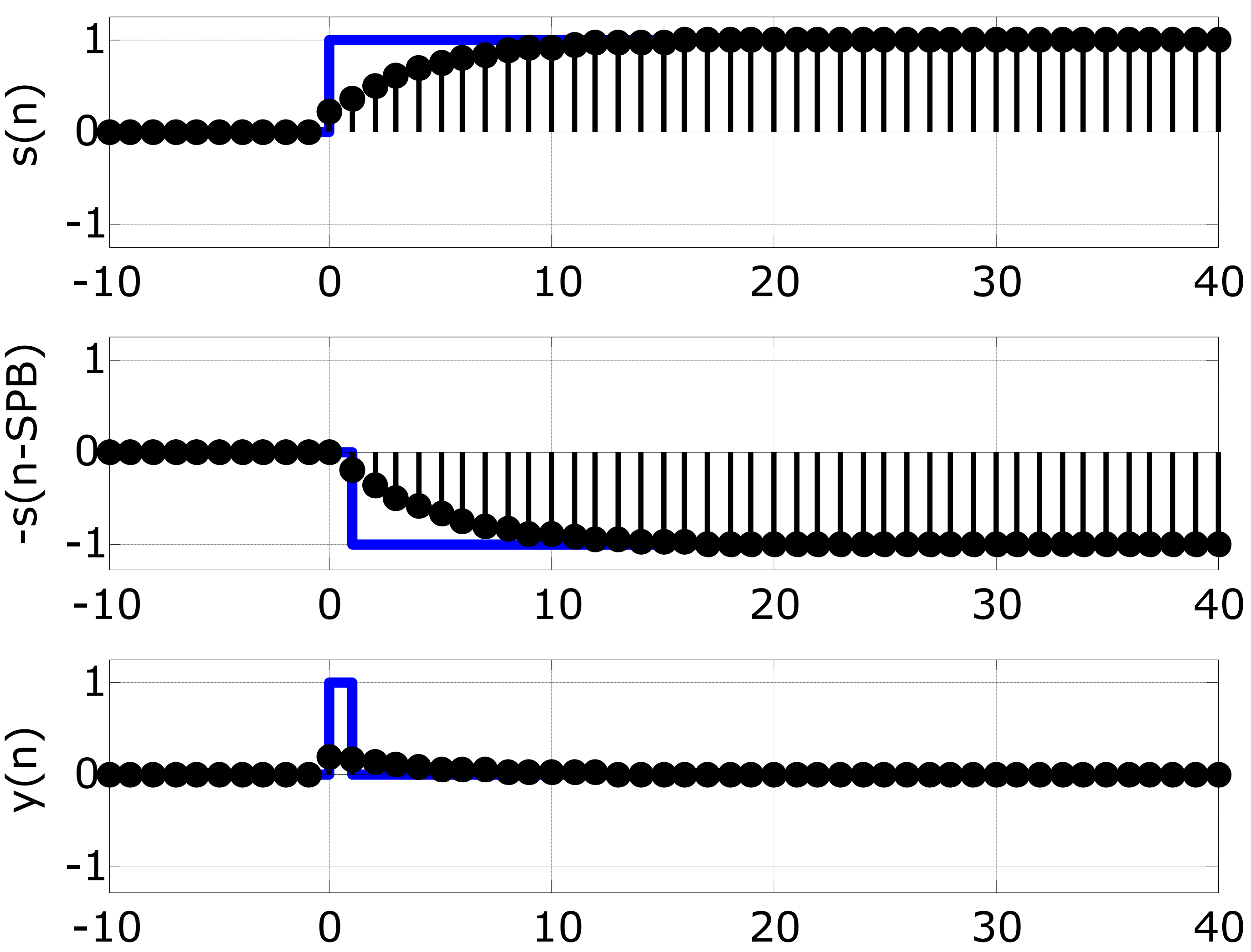
Black = output

Response to single bit (bit time=1 SPB)

s(n) = Exponential approach,

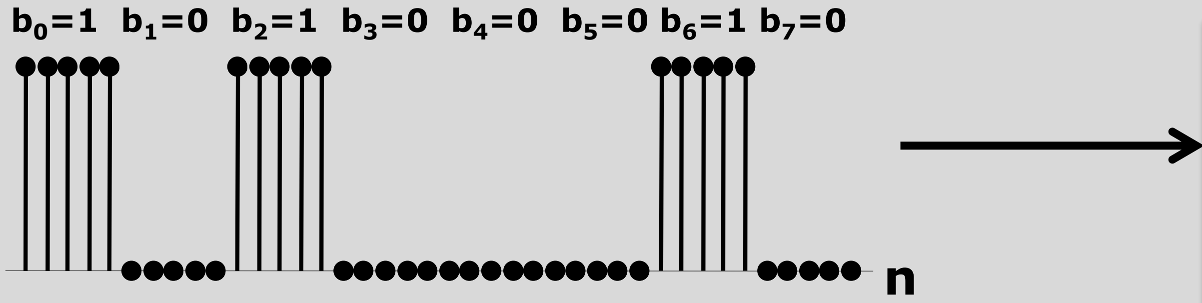
a = 0.8

k = 1



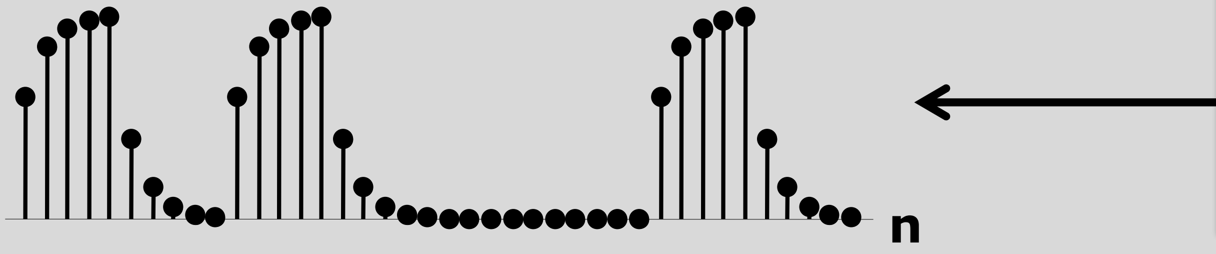
Blue = input
Black = output

Response to more general input



$$x(n) = u(n) - u(n-5) + u(n-10) - u(n-15)\ldots$$

$$y(n) = s(n) - s(n-5) + s(n-10) - s(n-15)\ldots$$



At the receiver