

Summary of Some Key Results Related to Convolution

If: $y(t) = x(t) * h(t)$

Then: $a x(t-t_1) * b h(t-t_2)$
 $= ab y(t - (t_1 + t_2))$

If: $y_i(t) = x_i(t) * h(t), \quad i=1,2$

$$(a x_1(t-t_1) + b x_2(t-t_2)) * h(t)$$

$$= a y_1(t-t_1) + b y_2(t-t_2)$$

$$(a x_1(t-t_1) + b x_2(t-t_2)) * h(t-t_0) =$$

$$= a y_1(t - (t_1 + t_0)) + b y_2(t - (t_2 + t_0))$$

If: $y[n] = x[n] * h[n]$

Then: $a x[n-n_1] * b h[n-n_2] =$
 $= ab y[n-(n_1+n_2)]$

If: $y_i[n] = x_i[n] * h[n], i=1,2:$

Then: $(a x_1[n-n_1] + b x_2[n-n_2]) * h[n] =$
 $= a y_1[n-n_1] + b y_2[n-n_2]$

$(a x_1[n-n_1] + b x_2[n-n_2]) * h[n-n_0] =$
 $= a y_1[n-(n_1+n_0)] + b y_2[n-(n_2+n_0)]$