MATHEMATICAL NOTATION

The radar and Electronic Warfare communities generally accept some commonly used notation for the various parameters used in radar and EW calculations. For instance, "P" is almost always power and "G" is almost always gain. Textbooks and reference handbooks will usually use this common notation in formulae and equations.

A significant exception is the use of "α" for space loss. Most textbooks don't develop the radar equation to its most usable form as does this reference handbook, therefore the concept of "α" just isn't covered.

Subscripts are a different matter. Subscripts are often whatever seems to make sense in the context of the particular formula or equation. For instance, power may be "P", "P_T", "P_t", or maybe "P_1". In the following list, generally accepted notation is given in the left hand column with no subscripts. Subscripted notation in the indented columns is the notation used in this handbook and the notation often (but not always) used in the EW community.

α	=	Space loss
α_1	=	One way space loss, transmitter to receiver
α_2	=	Two way space loss, transmitter to target (including radar cross section) and back to the receiver
α_{1t}	=	One way space loss, radar transmitter to target, bistatic
α_{1r}	=	One way space loss, target to radar receiver, bistatic

Other notation such as α_{tm} may be used to clarify specific losses, in this case the space loss between a target and missile seeker, which could also be identified as α_{1r} .

A	=	Antenna aperture (capture area)
A_e	=	Effective antenna aperture
Å	=	Angstrom
B	=	Bandwidth (to 3dB points)
B_{IF}	=	3 dB IF bandwidth of the receiver (pre-detection)
B_J	=	Bandwidth of the jamming spectrum
B_{MHz}	=	3 dB bandwidth in MHz
B_N	=	Equivalent noise bandwidth, a.k.a. B
B_V	=	3 dB video bandwidth of the receiver (post-detection) (Subscript V stands for video)
BF	=	Bandwidth reduction factor (jamming spectrum wider than the receiver bandwidth)
BW	=	Beamwidth (to 3 dB points)
c	=	Speed of Light
f	=	Frequency (radio frequency)
f_c	=	Footcandle (SI unit of illuminance)
f_D	=	Doppler frequency
f_R	=	Received frequency
f_T	=	Transmitted frequency
G	=	Gain
G_t	=	Gain of the transmitter antenna
G_r	=	Gain of the receiver antenna
G_{tr}	=	Gain of the transmitter/receiver antenna (monostatic radar)
G_J	=	Gain of the jammer

G_{JA} = Gain of the jammer antenna
G_{JT} = Gain of the jammer transmitter antenna
G_{JR} = Gain of the jammer receiver antenna
G_{σ} = Gain of reflected radar signal due to radar cross section

h = Height or Planks constant
h_{radar} = Height of radar
h_{target} = Height of target

J = Jamming signal (receiver input)
J_1 = Jamming signal (constant gain jammer)
J_2 = Jamming signal (constant power jammer)
J/S = Jamming to signal ratio (receiver input)

k = Boltzmann constant
$K_{1,2,3,4}$ = Proportionality constants, see Sections 4-3, 4-4, 4-5, and 4-1 respectively.

λ = Lambda, Wavelength or Poisson factor

L = Loss (due to transmission lines or circuit elements)

N = Receiver equivalent noise input (kT_oB)

NF = Noise figure

P = Power
P_d = Probability of detection
P_D = Power density
P_J = Power of a jammer transmitter
P_n = Probability of false alarm
P_r = Power received
P_t = Power of a transmitter

R = Range (straight line distance)
R_1 = Bistatic radar transmitter to target range
R_2 = Bistatic radar target to receiver range
R_J = Range of jammer to receiver (when separate from the target)
R_{NM} = Range in nautical miles

σ = Sigma, radar cross section (RCS)

S = Signal (receiver input)
S_R = Radar signal received by the jammer
S_{min} = Minimum receiver sensitivity

t = Time
t_{int} = Integration time
t_r = Pulse Rise Time
τ = Pulse Width

V = Velocity
V_r = Radial velocity