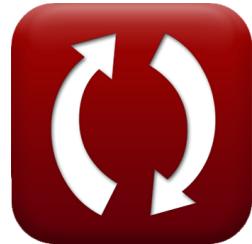


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Mobile Radio Propogation Formulas

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List of 16 Mobile Radio Propogation Formulas

Mobile Radio Propogation ↗

1) Block of N Serial Source ↗

fx $N_s = \frac{T_d}{T}$

Open Calculator ↗

ex $6 = \frac{1800s}{300s}$

2) Cumulative Distribution Function ↗

fx $CDF = t_{avg} \cdot n_R$

Open Calculator ↗

ex $38.5 = 3.5s \cdot 11$

3) Level Crossing Rate ↗

fx $N_R = (\sqrt{2 \cdot \pi}) \cdot F_m \cdot \rho \cdot e^{-(\rho^2)}$

Open Calculator ↗

ex $13.67409 = (\sqrt{2 \cdot \pi}) \cdot 0.0551\text{kHz} \cdot 0.1 \cdot e^{-(0.1)^2}$



4) Long Term Fading ↗

fx $M_t = \frac{R_t}{R_{ot}}$

[Open Calculator ↗](#)

ex $2.5 = \frac{26}{10.4}$

5) Maximum Possible S by N Ratio ↗

fx $SN_m = SN_{out} \cdot F$

[Open Calculator ↗](#)

ex $390\text{dB} = 30\text{dB} \cdot 13\text{dB}$

6) Mobile Radio Distance ↗

fx $d = \left(\frac{\alpha}{C} \right)^{\frac{1}{4}}$

[Open Calculator ↗](#)

ex $2\text{m} = \left(\frac{160}{10\text{W}} \right)^{\frac{1}{4}}$

7) Mobile Radio Signal ↗

fx $R_t = M_t \cdot R_{ot}$

[Open Calculator ↗](#)

ex $26 = 2.5 \cdot 10.4$



8) Mobile Receiver Carrier Power ↗

fx $C = \alpha \cdot d^{-4}$

[Open Calculator ↗](#)

ex $10W = 160 \cdot (2m)^{-4}$

9) Multipath Fading ↗

fx $R_{ot} = \frac{R_t}{M_t}$

[Open Calculator ↗](#)

ex $10.4 = \frac{26}{2.5}$

10) Noise Figure ↗

fx $F = \frac{SN_m}{SN_{out}}$

[Open Calculator ↗](#)

ex $13dB = \frac{390dB}{30dB}$

11) Path Loss Coefficient ↗

fx $\alpha = \frac{C}{d^{-4}}$

[Open Calculator ↗](#)

ex $160 = \frac{10W}{(2m)^{-4}}$



12) Selective Retransmission ↗

$$fx \quad R_s = \frac{N_{wd} \cdot L}{H \cdot E_n + B_{wd} \cdot E_1 \cdot N_{wd}}$$

Open Calculator ↗

$$ex \quad 0.072298 = \frac{19 \cdot 3}{9 \cdot 4 + 12 \cdot 3.3 \cdot 19}$$

13) Serial to Parallel Modulation Time Period ↗

$$fx \quad T = \frac{T_d}{N_s}$$

Open Calculator ↗

$$ex \quad 300s = \frac{1800s}{6}$$

14) Short Term Fading ↗

$$fx \quad R_o = R_t \cdot M_t$$

Open Calculator ↗

$$ex \quad 65 = 26 \cdot 2.5$$

15) Stop-and-Wait ARQ Technique ↗

$$fx \quad R = \frac{N_{wd} \cdot L}{(H + B_{wd} \cdot N_{wd}) \cdot E_n}$$

Open Calculator ↗

$$ex \quad 0.060127 = \frac{19 \cdot 3}{(9 + 12 \cdot 19) \cdot 4}$$



16) Symbol Duration ↗

fx $T_d = N_s \cdot T$

Open Calculator ↗

ex $1800\text{s} = 6 \cdot 300\text{s}$



Variables Used

- B_{wd} Number of Bits per Word
- C Mobile Reciever Carrier Power (*Watt*)
- CDF Cumulative Distribution Function
- d Transmitter Reciever Distance (*Meter*)
- E_1 Expected One Transmission
- E_n Expected Number of Transmission
- F Noise Figure of Amplifier (*Decibel*)
- F_m Maximum Doppler Shift (*Kilohertz*)
- H Header Bits
- L Information Bits
- M_t Long Term Fading
- n_R Normalized LCR
- N_R Level Crossing Rate
- N_s Block of N Serial Source
- N_{wd} Number of Word Message Consist
- R Stop-and-Wait ARQ Technique
- R_o Short Term Fading
- R_{ot} Multipath Fading
- R_s Selective Retransmission
- R_t Mobile Radio Signal
- SN_m Maximum Possible S/N Ratio (*Decibel*)



- SN_{out} Actual S/N Ratio at Output (Decibel)
- T Time Period (Second)
- t_{avg} Average Duration of Fade (Second)
- T_d Symbol Duration (Second)
- α Path Loss Coefficient
- p Normalized RMS Value



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Constant:** **e**, 2.71828182845904523536028747135266249
Napier's constant
- **Function:** **sqrt**, sqrt(Number)
Square root function
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion ↗
- **Measurement:** **Time** in Second (s)
Time Unit Conversion ↗
- **Measurement:** **Power** in Watt (W)
Power Unit Conversion ↗
- **Measurement:** **Noise** in Decibel (dB)
Noise Unit Conversion ↗
- **Measurement:** **Frequency** in Kilohertz (kHz)
Frequency Unit Conversion ↗



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