calculatoratoz.com

unitsconverters.com

Data Transmissions and Error Analysis Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

© calculatoratoz.com. A softusvista inc. venture!

List of 14 Data Transmissions and Error Analysis Formulas

Data Transmissions and Error Analysis

1) Average Probability of Correct Decision

Open Calculator

fx $P_c = 1 - P_e$

ex $0.6 = 1 - 0.4$

2) Average Probability of Error

Open Calculator

fx $P_e = 1 - P_c$

ex $0.4 = 1 - 0.6$

3) Average Signal Power

Open Calculator

fx $P_{av} = P_{ab} \cdot B_{sym}$

ex $2.4\text{W} = 0.30 \cdot 8\text{bits}$

4) Average Signal Power for Two Dimensional Constellation

Open Calculator

fx $P_{av} = 2 \cdot SNR_{av} \cdot P_{an}$

ex $2.448\text{W} = 2 \cdot 0.72 \cdot 1.7\text{W}$

© calculatoratoz.com. A softusvista inc. venture!

5) Average Signal Power per Bit

Open Calculator

fx $$P_{ab} = \frac{P_{av}}{B_{sym}}$$

ex $$0.30625 = \frac{2.45W}{8bits}$$

6) Average SNR for Two Dimensional Constellation

Open Calculator

fx $$SNR_{av} = \frac{P_{av}}{2 \cdot P_{an}}$$

ex $$0.720588 = \frac{2.45W}{2 \cdot 1.7W}$$

7) Average SNR per Bit

Open Calculator

fx $$SNR_{ab} = \frac{P_{av}}{2 \cdot B_{sym} \cdot P_{an}}$$

ex $$0.090074 = \frac{2.45W}{2 \cdot 8bits \cdot 1.7W}$$

8) Bit Error Rate

Open Calculator

fx $$BER = \frac{N_e}{N_t}$$

ex $$0.6 = \frac{3}{5}$$

© calculatoratoz.com. A softusvista inc. venture!

9) Maximum Possible Data Rate over Channel

Open Calculator

fx $$C = 2 \cdot B \cdot \log 2\left(1 + \left(\frac{P_{av}}{P_{an}}\right)\right)$$

ex $$5.665337\text{b/s} = 2 \cdot 2.2\text{Hz} \cdot \log 2\left(1 + \left(\frac{2.45\text{W}}{1.7\text{W}}\right)\right)$$

10) Number of Bits in Error

Open Calculator

fx $$N_e = BER \cdot N_t$$

ex $$3.05 = 0.61 \cdot 5$$

11) Number of Bits per Symbol

Open Calculator

fx $$B_{sym} = \frac{B_{rate}}{S_{rate}}$$

ex $$8.045977\text{bits} = \frac{7\text{b/s}}{0.87\text{Sym/s}}$$

12) Number of Symbol in Error

Open Calculator

fx $$N_{se} = SER \cdot N_{st}$$

ex $$18 = 2 \cdot 9$$

13) Symbol Error Rate

Open Calculator

fx $$\mathrm{SER} = \frac{\mathrm{N_{se}}}{\mathrm{N_{st}}}$$

ex $$2 = \frac{18}{9}$$

14) Symbol Rate given Bit Rate

Open Calculator

fx $$\mathrm{S_{rate}} = \frac{\mathrm{B_{rate}}}{\mathrm{B_{sym}}}$$

ex $$0.875\mathrm{Sym/s} = \frac{7\mathrm{b/s}}{8\mathrm{bits}}$$

© calculatoratoz.com. A softusvista inc. venture!

Variables Used

- **B** Radio Channel Bandwidth *(Hertz)*
- B_{rate} Bit Rate *(Bit Per Second)*
- B_{sym} Number of Bits per Symbol *(Bit)*
- **BER** Bit Error Rate
- **C** Channel Capacity *(Bit Per Second)*
- N_e Number of Bits in Error
- N_{se} Number of Symbols in Error
- N_{st} Number of Symbols Transmitted
- N_t Total Number of Bits Transmitted
- P_{ab} Average Signal Power per Bit
- P_{an} Average Noise Power *(Watt)*
- P_{av} Average Signal Power *(Watt)*
- P_c Average Probability of Correct Decision
- P_e Average Probability of Error
- S_{rate} Symbol Rate *(Symbols per Second)*
- **SER** Symbol Error Rate
- SNR_{ab} Average SNR per Bit
- SNR_{av} Average SNR

© calculatoratoz.com. A softusvista inc. venture!

Constants, Functions, Measurements used

- Function: **log2**, log2(Number)
  Binary logarithm function (base 2)
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion
- Measurement: **Data Storage** in Bit (bits)
  Data Storage Unit Conversion
- Measurement: **Bandwidth** in Bit Per Second (b/s)
  Bandwidth Unit Conversion
- Measurement: **Symbol Rate** in Symbols per Second (Sym/s)
  Symbol Rate Unit Conversion

© calculatoratoz.com. A softusvista inc. venture!

Check other formula lists

- **Cellular Concepts Formulas**
- **Data Analysis Formulas**
- **Data Transmissions and Error Analysis Formulas**
- **Frequency Reuse Concept Formulas**
- **Mobile Radio Propogation Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

1/16/2024 | 9:26:28 PM UTC

Please leave your feedback here...

© calculatoratoz.com. A softusvista inc. venture!