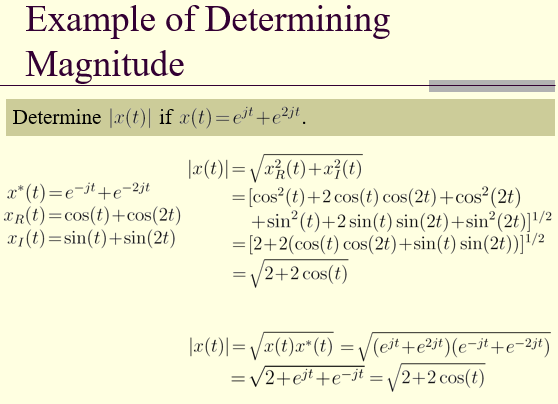
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| --- | --- | --- | --- |
| **ECE 3300 Exam 1 Notes Sheet Spring 2017 — Revision 7** | | | |
| **Absolute Time Duration** | Amplitude Scaling:  Stretches signal in **vertical** direction  Time Scaling:  Stretches signal in **horizontal** direction | Absolute Value |  |
| **Even Signals** | **Odd Signals** |  | |
| Every signal is equal to the sum of its even and odd parts | | **Unit Signum** |  |
| **Unit Rect Signal** | | **Time Scaled Continuous Time Rect Signal** |  |
| **Sampling Property of Impulses** | | Every instance of a function of time multiplied by an impulse should be simplified to a number multiplied by an impulse. |
| **Converting Integration Limits** | | **Converting Summation Limits** | **Deriviative & Difference Signal** |
| **Effects of Jumps on Derivatives** | | **Integral & Summation Signal** | **Deriviative and Differences of Steps** |
| **Effects of Impulses on Integrals**  *Impulses become jumps* | | **Integrals and Summation of Impulses** | **Fundamental Cycle**  For :    For , |
|  | | **Periodic Integrals and Summations** | **Signal Regeneration** |
| **Least Common Multiple** | | **Impulse Train**  The continuous/discrete-time unit impulse train with fundamental period / is defined below: |  |



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Rectangular Form Signal** | | | **Polar Form Signal** | | | | **Polar-Rectangular Form Relationships** | | | | | | |
| **USEFUL TRIG**  **IDENTITIES** | | |  | | |  | | | | | | | | Using these trig ID’s: |
|  | **Complex Conjugates**  The complex conjugate of a signal is obtained by replacing every instance of with | | | *Purely real:*  *Purely Imaginary:* | | | | Image result for muffin clipart | | |  | | | |
|  | **Magnitude and Phase**    𝑙𝑒 aseery instance of esepsal even and od | | | ***Sidenote***  For the magnitude squared:  becomes | | | **Real Parts** | | | | | | **Imaginary Parts** | |
|  | **Energy** | | | **THINGS TO CHECK**  1. If taking derivative of periodic signal, verify jumps at the end of the period!  2. For LCM, use the *Examples of Sinusoidal Signals* slide to find the LCM of the fundamental period | | | | | | | | | | |
| **APERIODIC** | | **Correlation**    **SEE NOTE BELOW** | | **Mean Square Error (MSE)** | | | | The “energy of the error” | | | | | | |
| **Correlation Coefficient**  The correlation coefficient between both and or and is defined: | | **Power of Aperiodic Signals** | | | | | | | | **Relationship Between Correlation, MSE, and Energy** | | |
| **PERIODIC** | | **Correlation of Periodic Signals**  The correlation between and or and is defined: | | **Power of Periodic Signals** | | | |  | | | | | | |
| If is the fundamental period of and | | If is the fundamental period of and | | | | | **Correlation Coefficient of Periodic Signals**  The correlation coefficient between both and or and is defined: | | | | | |
| **Mean-Square Error of Periodic Signals** | | |  | | | | | **Relationship Between Correlation, MSE, and Power** | | | | |
| If is the fundamental period of and | | | If is the fundamental period of and | | | | |  | | | | |

**Watch for the tildes!**

Periodic Signals and their functions have them:

Aperiodic Signals don’t!:

**Signal Modification**

A signal,, is on between 1 and 3.

* would modify that to be and 1
* would modify that to be -2 and 0

**CORRELATION**

Since the C.C. is used to compare 2 functions, we will only care about the area that the 2 functions overlap when setting up the integration limits.