**DISCOVERY PROJECT II-II**

**EEL3135-SIGNAL AND SYSTEM**

**Instructor:** Dr. Jean H. Andrian

**Objective**: To focus on the vector-signal analogy as a framework of understanding for signal decomposition. The primary goals of this project were for students to understand the motivation and use of orthonormal basis sets.

**Due date:** 03/18/2015

**Question**

1. Give your most complete definition of a vector space or a linear space.
2. Give examples of Vector (Linear) spaces.
3. and are Linear Spaces defined as

Where and are either real or complex numbers.

Give the standard basis Vectors for

1. Let the set of all complex-valued continuous-time signals with the finite time axis . Does it form a linear space?
2. The Inner Product (Dot Product) in () is defined as

And norm (length) of as

Two Vectors of () are orthogonal if

A set of orthogonal vectors spans () if every vector of () can be written as

How do you find the coefficients ? Is that the only orthogonal set spanning **RN  (CN )**

Likewise in , the inner product of two signals and is defined as

Consider the following signals

Show that they form an orthogonal set.

The length of is

Let , approximate in the interval [-1,1] by as

that is find . Let

the Taylor series approximation of .

Plot on the same graph on the interval [-1,1], .

1. Plot on the same graph in the interval [-1,1], , and .

Finally compute and compare .

Draw your conclusion from the last three questions.

**Requirement and Submission** **\*Please read\***

The answer should be in essay writing in your own word and the picture can be included.

The file should be sent in Word or PDF format only.

Hand writing and picture file will not be accepted.

**For regular class**: *Please submit the project as a hard copy in class on the due date.*

**For feed class**: *Please state the email subject as: EEL3135 Discovery Project II-II,*

*then send it to* [*stang018@fiu.edu*](mailto:stang018@fiu.edu)

***\* Late submission will not be accepted\****

*\*For regular homework, please submit it as a hard copy in class. Only students in feed class will submit through email to* [*stang018@fiu.edu*\*](mailto:stang018@fiu.edu*)

**Answering Format**

The figure below demonstrates the answering sheet format:

The Question

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Name:

PID:

Due Date:

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