ECE 641 LABORATORY FOR HIGH PERFORMANCE DIGITAL SIGNAL PROCESSING

**An Implementation of the Gram-Schmidt algorithm in CUDA**

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**TITLE:**  Implementing the Gram-Schmidt algorithm in CUDA

**PROJECT DESCRIPTION**

The Gram-Schmidt process is a recursive algorithm that takes a set of vectors as input and generates an orthogonal vector set that spans the same vector space as the input [1].

Let the p input vectors be X so that

= **,** where each  http://whatis.techtarget.com/WhatIs/images/elem-of.gif

Then the outputs vector set V = , where

Although the procedure is inherently recursive, it can be seen that linear operations are performed on the same vectors several times in order to create the final output. The objective of this project would be to compute these values in parallel, and synthesize the final vector set V in p-1 step. In these steps, the ith step would perform p – i + 1 dot products, and linearly combine i + 1 vectors.

**REFERENCES**

[1] *Introduction to Linear Algebra 4th Edition, G. Strang. P.235*