Virtual Prototyping using VHDL

RASSP E&F Module Number: 32

Audience: System design engineer, digital design engineer, first year graduate student.

Module Objectives:

To educate the designer on the concepts, methods, and standards used for virtual prototyping of systems using the VHSIC Hardware Description Language (VHDL).

Specific Objectives:

Provide information on:

1) Introduction and definition of terms used for virtual prototyping
2) Description of the virtual prototyping process
3) Virtual prototyping as a part of the RASSP methodology
4) Abstraction levels and limitations of virtual prototyping
5) Using VHDL executable requirements in the virtual prototyping process

6) The role of VHDL executable specifications in the virtual prototyping process
7) Data and control flow modeling in the RASSP design process
8) VHDL performance modeling within the methodology
9) Where VHDL hybrid modeling fits in the RASSP process
10) Designing behavioral models in VHDL for system simulation
11) Design example of a single processor system with a VME bus interface
12) Relevant Documents and Standards for Virtual Prototyping

Prerequisites:

Prerequisite Modules:

RASSP Methodology Overview

Prerequisite Knowledge:

VHDL Modules 12 and 13

Syllabus:

1) Introduction and definition of terms used for VP	(30 Min)
2) Description of the virtual prototyping process	(20 Min.)
a) Goals and scope of virtual prototyping	
b) The RASSP process and it reliance on virtual prototyping	
3) Abstraction levels and scope of virtual prototyping	(5 Min.)
4) The virtual prototyping process	(175 Min.)
a) Executable requirements in VHDL	
b) Executable specifications in VHDL	
c) Data/control flow modeling in the VP process	
d) VHDL Performance modeling in the VP process	
e) Hybrid modeling techniques	
f) VHDL Full behavioral modeling and detailed design	
i) Design example overview	
ii) Processor modeling	
iii) Testbench modeling	
iv) Testing a model	
v) Memory controller modeling	
vi) Memory modeling	
vii) VME interface model	
5) Relevant Documents and Standards	(5 Min.)
6) Summary	(5 Min.)