README - bench_FFT

Note

This is not a shipping example from MATHWORKS. This example has been prepared by bsingh@mathworks.com as part of exploring MATLAB/Simulink based workflows for generating Testbench infrastructure in SystemVerilog (SV-DPI-C models and UVM bench). Please refer to MATHWORKS documentation or contact me in case of questions.

Folder structure

- **mcode** This folder contains the MATLAB code and parameter initialization script
  - **calc_fft.m** calculates FFT for reference FRAME and is called by fftchecker.m
  - **fftchecker.m** This function contains Self-checking logic and compares DUT calculated FFT results against Expected output
  - **genStim.m** This function generates Stimulus as a Vector for FFT block
  - **genframes2Sample.m** This function calls genStim and then streams samples from the genStim Vector output to the FFT block
  - **mlab_bench.m** This function is MATLAB only testbench for FFT block
  - **param_init** This script setups all Simulink parameters and Variables need by the model
- **models**
  - **tb_FFT.slx** Model of Simulink Testbench
- **rtl**
  - RTL of FFT
- **scripts**
  - gen_dpi.m Script to generate SV DPI-C model for Stimulus function and Checker function
  - gen_uvm.m Script to generate UVM bench from tb_FFT.slx
  - init_var.m Simulink Project Startup script.

  - test_script.mlx - Live script used for building initial bench for FFT

Instructions to run the model

- Open the Bench_FFT.prj. This will run the startup script init_var.m and create work folder
- From project view in middle pane, open models/tb_FFT.slx
- Run the model

Usecase - Verification Workflow

MATLAB to SV DPI-C component generation

- **Initial analysis** DV engineer uses test script to do analysis and build MATLAB functions for Stimulus and Checker
- **MATLAB function based TB** DV engineer automatically converststs live script to mlab_bench
- **SV DPI-C component generation** DV engineer integrates the SV DPI-C components in his SV testbench

- DV engineers build his SV Testbench or UVM testbench reusing the SV DPI-C components

Build UVM bench from Simulink

- **Reuse MATLAB stimulus and Checker function** in MATLAB functions block to build Sequence and Scoreboard subsystem
- **Build UVM bench** Run gen_uvm script from work folder that is created by the project
- run uvm test from work/uvm_build/tb_FFT_uvm_testbench/top directory by using run scripts for the corresponding EDA tool

Cosimulation bench for Handcoded RTL

- **Import Handcoded RTL** Use cosimWizard from MATLAB prompt
- **Build Cosim bench** Example work/bench_cosim_wizard/Cosim_tb_FFT_in.slx
- Please contact bsingh@mathworks.com if interested in this workflow to