Matlab and Simulink Creation and Animation of X3D Graphics in Web-Based Simulation

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Introduction

- Matlab - A powerful tool to compute high-fidelity engineering model and plot the result in figures.
- Simulink - Implemented .m code into block diagrams and flow charts to execute the simulation.
- X3D – Web-Based 3D model object so we can apply it into web-based animation in future work.
- X3DOM -(pronounced X-Freedom) is an open-source framework and runtime for 3D graphics on the Web.
Multiple Solutions

- Matlab and Simulink to Web-Based Simulation Application Flow Chart

Key:
- Convert
- Load
- Live Event Link

Matlab .m → Matlab .fig → VRML .wrl

HUMUSoft VRML Player

HUMUSoft HTML (Modified X3DOM)
High-Fidelity Engineering Model

- Phased Array Antenna Model

For the this example:

$$AF = \left[1 + e^{j(\beta d \cos \theta_d + \alpha)}\right]$$

Broadside Scan All Elements Excited

2D, ugh~

3D, 😛👍
High-Fidelity Engineering Model

Original Phased Array Antenna Model in Matlab.m converted to .x3d and VRML .wrl and X3DOM .xhtml

Online at http://x3dgraphics.com/examples/X3dForAdvancedModeling/Matlab
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HUMUSoft HTML (Modified X3DOM)
• Simulink block diagrams computing the movement of red cube by Free Fall Equations
• Hooks Law to represent the resilient force
Simulink Animation

- Block Diagrams of Simulink Implementation

X3DOM engine
http://localhost:8123

No Attenuation Example

Position | Velocity | Force Variation
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