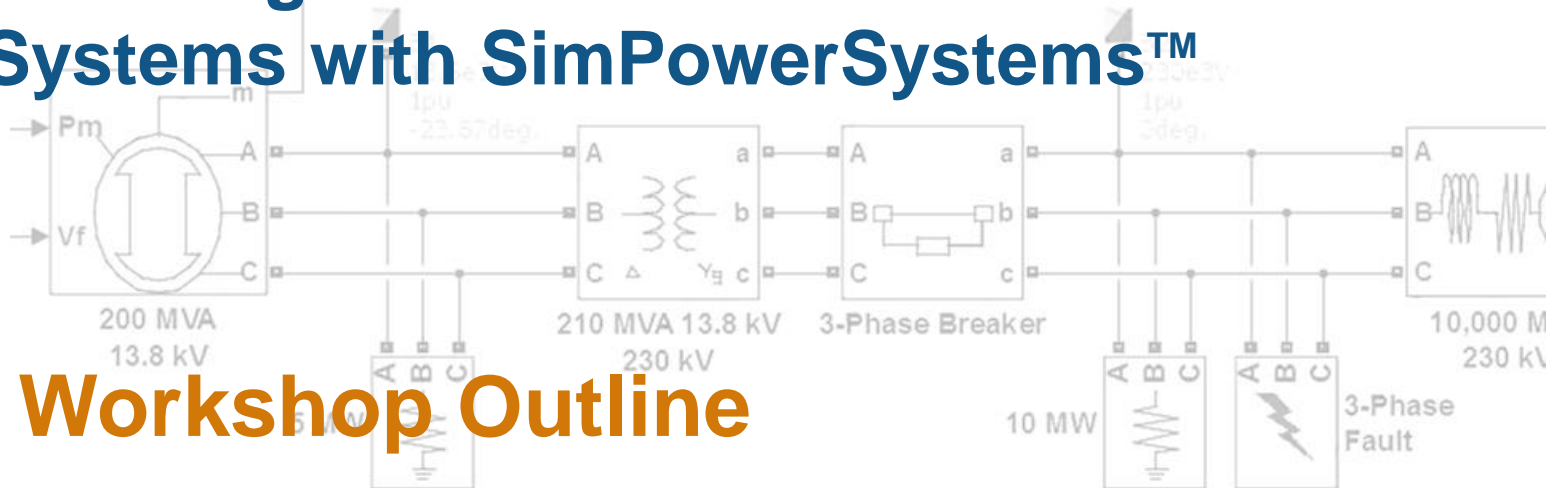


SimPowerSystems Hands-on Workshop: Modeling and Simulation of Electrical Power Systems with SimPowerSystems™

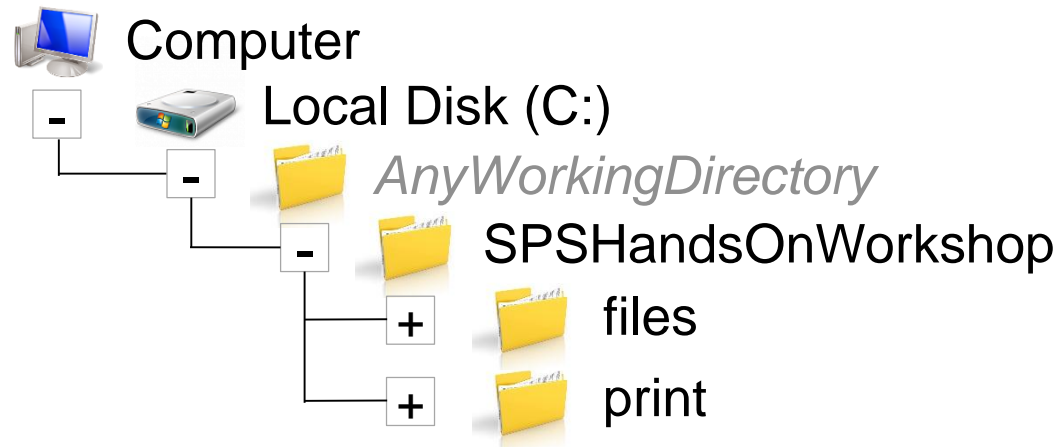


Carlos Osorio
Principal Application Engineer
MathWorks – Natick, MA

Workshop Setup Instructions

1. Copy the ZIP file:
SPSHandsOnWorkshop.zip

2. Unzip the file:



3. At the MATLAB command prompt type:
`>> start_SPSHandsOnWorkshop`

Workshop Outline

1. Introduction

- SimPowerSystems component libraries
- How does SimPowerSystems work?

2. Three-Phase Systems

- Measurements
- State initialization
- Transformers
- Star vs. delta connections
- Floating vs. neutral connections
- Reference frame transformations

Workshop Outline

3. Electrical Machines

- Machine measurements
- Machine initialization
- Load flow calculation
- Mechanical connections to loads and prime movers

4. Simulation Performance

- Model fidelity vs. simulation speed
- SimPowerSystems simulation modes

Workshop Outline

5. Control of Electrical Machines

- Electrical disturbances
- Control of synchronous generators
- Electric motor drives

6. Custom Electrical Components

- Simulink-based electrical components
- Modifying Specialized Technology library components
- Simscape language and Simscape Components library
- Simscape and SimPowerSystems interfaces
- Model sharing and IP protection

Workshop Outline

7. Power Electronics

- SimElectronics or SimPowerSystems?
- Ideal switching algorithm
- Power quality and harmonic analysis
- Control design and linearization

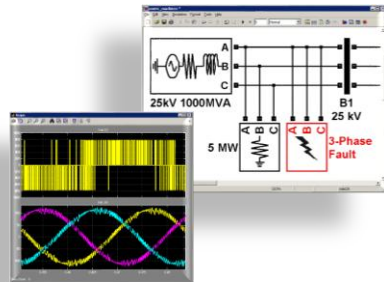
8. Discussion and Q&A

MathWorks Product Overview



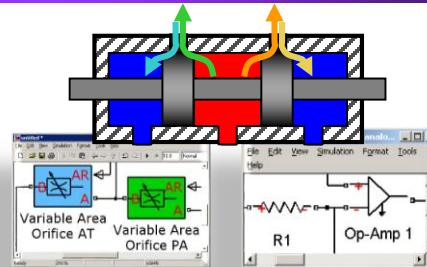
Physical Modeling in Simulink®

SimPowerSystems™



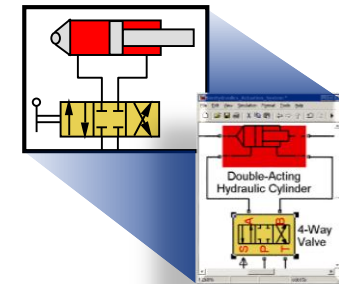
Electrical power systems

Simscape™



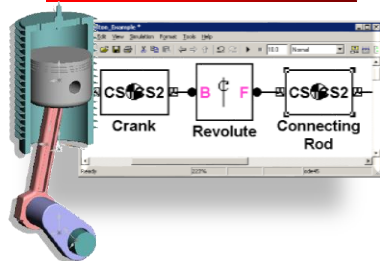
Multi-domain physical systems

SimHydraulics®



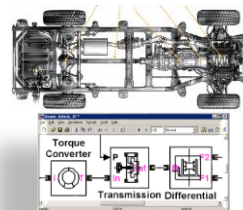
Fluid power and control

SimMechanics™



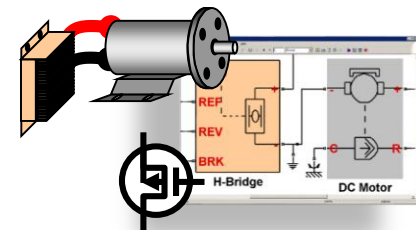
Mechanical dynamics (3-D)

SimDriveline™



Drivetrain systems (1-D)

SimElectronics™



Electromechanical and electronic systems

Model-Based Design Process

System and Component Level Design

