



Solar Power Information Kit

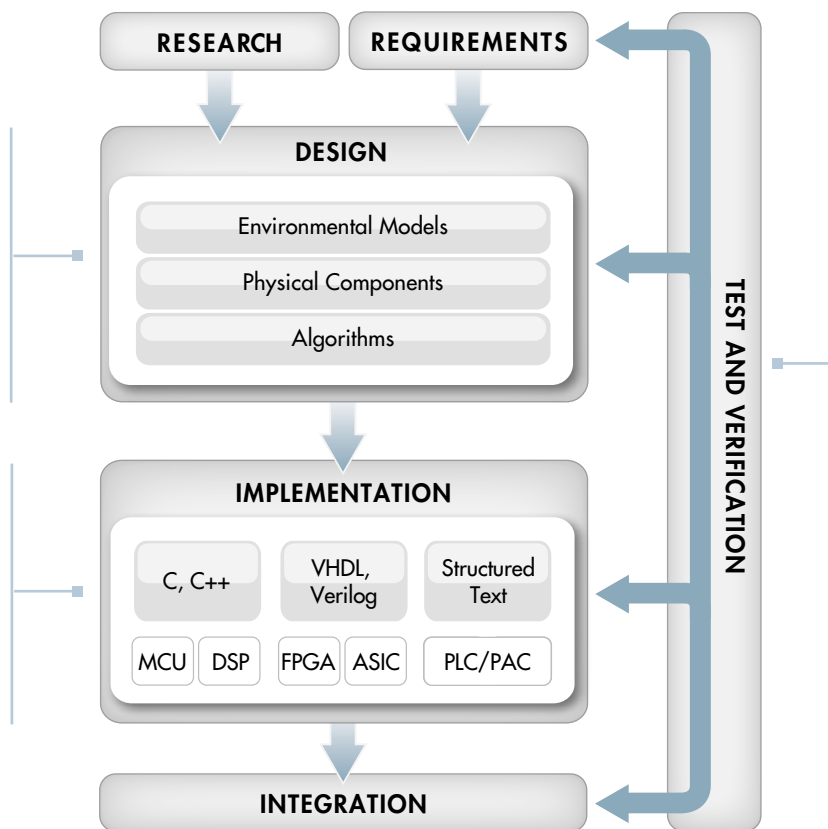
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Workflow for Model-Based Design

Power generation from the sun is scalable from residential to commercial applications. Scientists and engineers use MathWorks software to harness this energy source by:

- Modeling and analyzing the performance of photovoltaic panels
- Developing solar power inverters
- Simulating commercial-scale solar power plants



User Stories



- **ABB Accelerates Application Control Software Development for a Power Electronic Controller**



- **Electrodynamics Associates Designs High-Performance Generator Controller for the Military with Simulink and xPC Target**



- **Plug Power Accelerates Fuel Cell Control Development**

Technical Articles

- **Converting Models from Floating Point to Fixed Point for Production Code Generation**

Software engineers and suppliers in mass production environments often need to convert floating-point algorithms to fixed-point math for their integer-only hardware. Using the Fixed-Point Advisor and Fixed-Point Tool in Simulink Fixed Point™, a fault-tolerant fuel system model is converted from floating point to fixed point for production code generation.

On-Demand Webinars

▪ **Model-Based Design for Solar Power Systems**

Learn how to model a photovoltaic system that includes the array, the power converters and inverter electronics, and typical loads. MathWorks engineers will show to use simulation to perform design trade-offs and to develop and test control algorithms, including maximum power point tracking (MPPT). As a final step, they will automatically generate code for the control algorithms directly from the simulation model.

▪ **Developing Accurate Battery Simulation Models**

An accurate battery model is essential to system-level design and analysis for many battery-based systems such as hybrid electric vehicles (HEVs) and uninterruptible power supplies (UPSs). However, battery models are complex and difficult to parameterize to match real-world data. In this webinar, MathWorks engineers will develop a battery model and use test data to automatically tune the model parameters.

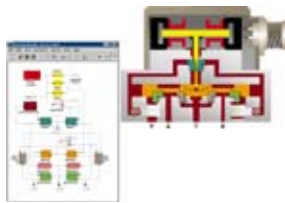
Key Products



- **Simulink**

- Simulation and Model-Based Design*

- Simulink® is an environment for multidomain simulation and Model-Based Design for dynamic and embedded systems. It provides an interactive graphical environment and a customizable set of block libraries that let you design, simulate, implement, and test a variety of time-varying systems, including communications, controls, signal processing, video processing, and image processing.

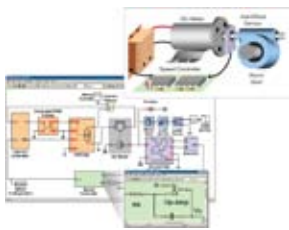


- **Simscape**

- Model and simulate multidomain physical systems*

- Simscape™ extends Simulink with tools for modeling systems spanning mechanical, electrical, hydraulic, and other physical domains as physical networks. It provides fundamental building blocks from these domains to let you create models of custom components. The MATLAB® based Simscape language enables text-based authoring of physical modeling components, domains, and libraries.

Key Products



▪ SimElectronics

Model and simulate electronic and electromechanical systems

SimElectronics® extends Simscape with tools for modeling and simulating electronic and electromechanical systems.

SimElectronics software enables you to include analog electronics and electromechanical components as physical networks within multidomain system models. It provides semiconductor, motor, drive, sensor, and actuator components, as well as building blocks that let you implement your own custom subsystems.



▪ SimPowerSystems

Model and simulate electrical power systems

SimPowerSystems™ extends Simulink with tools for modeling and simulating the generation, transmission, distribution, and consumption of electrical power. It provides models of many components used in these systems, including three-phase machines, electric drives, and libraries of application-specific models such as Flexible AC Transmission Systems (FACTS) and wind-power generation. Harmonic analysis, calculation of Total Harmonic Distortion (THD), load flow, and other key power system analyses are automated. SimPowerSystems models can be discretized to speed up simulations.

Additional Energy Segments

Engineers and scientists worldwide rely on MathWorks software to perform the challenging analysis, simulation, and product development tasks necessary to address the world's energy needs. You can use MATLAB and Simulink to evaluate energy resources, develop systems for power generation and distribution, model energy markets, and create products that consume less energy and are environmentally friendly.

Electric Vehicles

Electric Utilities

Solar Power

Oil and Gas

Wind Power

Trading and Risk