

### **Web seminar :**

**“Motor control design ~ Basic flow of plant modeling and control design ~”**

Date of implementation : 2018/04/24

Author : MathWorks Japan, Application Engineering Group (CDA),  
Senior Application Engineer, Keiichi Fukui

Video On Demand (About 30 minutes) - Japanese :

<https://jp.mathworks.com/videos/motor-control-design-basic-flow-of-plant-modeling-and-control-design-1524779743131.html>

MATLAB® Version : R2018a

---

### **File contents :**

Simscape Power Systems™ has two libraries. Firstly, the Simscape Components library based Simscape Language. Secondly, the Specialized Technology (Specialized Power Systems) library based Simulink.

In the folder of the **“English¥R2018a (or “R20...”)**”, there are the following two folders.

- #1) **“sps\_sc”** folder (Save a set of sample models created with Simscape Components.)
- #2) **“sps\_st”** folder (Save a set of sample models created with Specialized Technology (Specialized Power Systems).)

- The contents of the sample models of the above #1) and #2) are almost equal. In the above web seminar, I used the sample model of #1).
- Please see another file (**“foc\_controlsystem\_en.pdf”**) about the guideline for proper use of the above #1) and #2).

#### **<MATLAB files (“.m”, “.mat”)>**

##### **foc\_controlsystem\_param.m**

→ Setting file about various parameters of vector control (or foc (field oriented control)) of brushless DC motor (BLDC). We suppose that BLDC is almost equal to PMSM.

##### **foc\_controlsystem\_pwm\_Plopt\_sdosession.mat**

→ Setting file about auto-tuning of PI gains of vector control of BLDC.

#### **<Simulink® files (“.slx”)>**

##### **foc\_controlsystem\_average.slx**

→ Sample model about vector control of BLDC with ideal inverter (ideal voltage source).

##### **foc\_controlsystem\_pwm.slx**

→ Sample model about vector control of BLDC with inverter (IGBT×6).

### **foc\_controlsystm\_pwm\_Plopt.slx**

→ Sample model about auto-tuning of PI gains (velocity control) of BLDC with inverter (IGBT×6).

#### **<Procedure to run the sample models>**

Please see another file ("foc\_controlsystm\_en.pdf").

---

### **MATLAB products used :**

- Basic environment : MATLAB®, Simulink®
- Plant modeling : Simscape™, Simscape Power Systems™  
(From R2018b, Simscape Power Systems™ and Simscape Electronics™ are integrated as one electrical modeling tool. The new tool's name is Simscape Electrical™.)
- Control design : Simulink Control Design™, Control System Toolbox™
- Parameter optimization : Simulink Design Optimization™, Optimization Toolbox™

% Copyright 2018 The MathWorks, Inc.