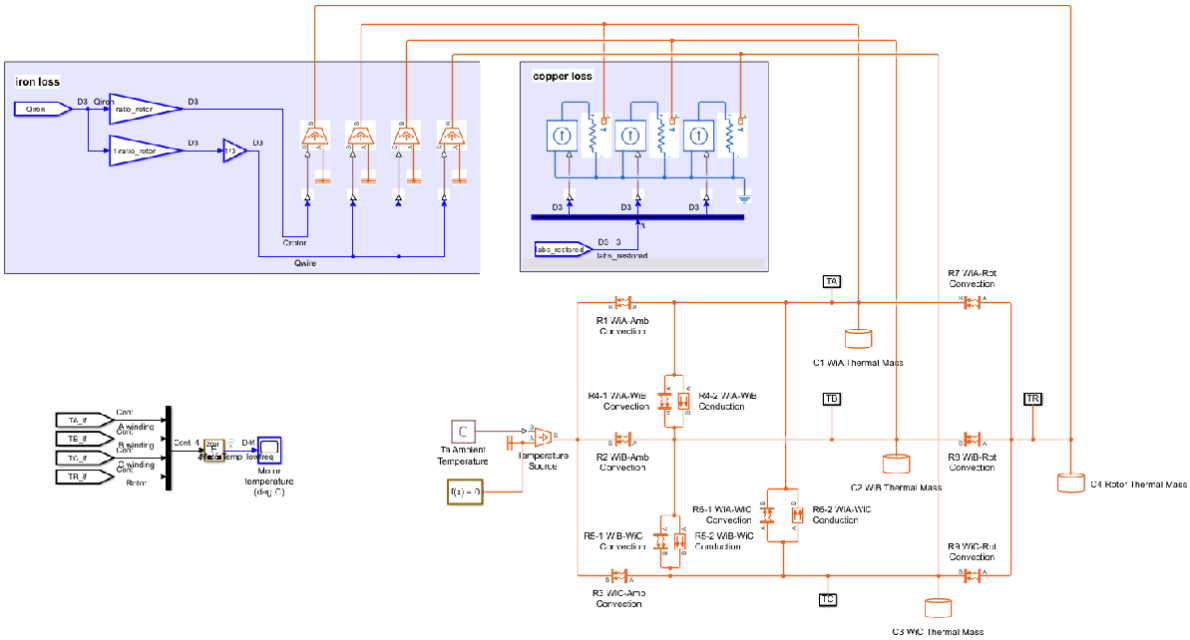
Identify thermal network



Assume that the parameters C1-C3, R1-R3, R4-R6, and R7-R9 are the same, respectively.

import data

```
load("identification\I_Ta_Qiron_T.mat");
```

time (s)

```
t = I_Ta_Qiron_T.time;
```

current (A)

```
Iabc = I_Ta_Qiron_T.Iabc;
```

ambient temperature (K)

```
Ta = I_Ta_Qiron_T.Ta;
```

iron loss (W)

```
Qiron = I_Ta_Qiron_T.Qiron;
```

temperature (K)

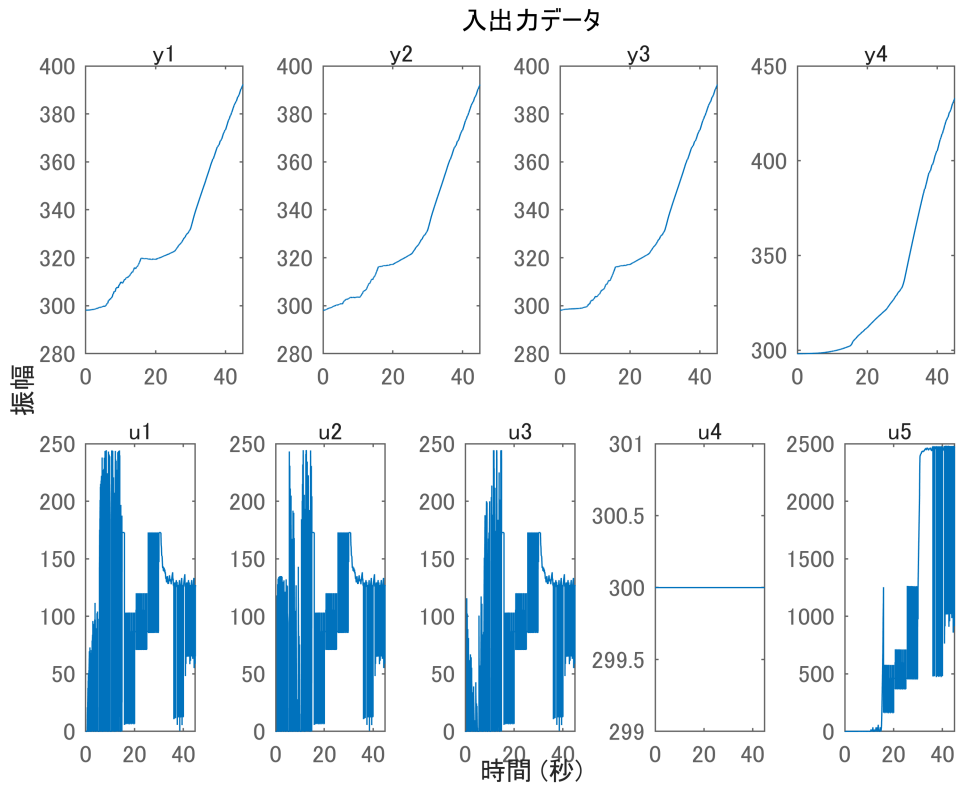
```
T = I_Ta_Qiron_T.T;
```

identification

create iddata

```
Ts = 0.01; % sampling period (s)
data = iddata(T,[Iabc,Ta,Qiron],Ts);
data.Tstart = 0;
```

```
plot(data);
```



model and initial parameters

```
file = "state_equation_identify";
order = [4,5,4]; % [ydim,udim,xdim]
controller_parameters();
parameters = [

struct("Name","C123","Unit","","Value",1,"Minimum",0,"Maximum",Inf,"Fixed",false)
;

struct("Name","C4","Unit","","Value",1,"Minimum",0,"Maximum",Inf,"Fixed",false);

struct("Name","R123","Unit","","Value",1,"Minimum",0,"Maximum",Inf,"Fixed",false)
;

struct("Name","R456","Unit","","Value",1,"Minimum",0,"Maximum",Inf,"Fixed",false)
;

struct("Name","R789","Unit","","Value",1,"Minimum",0,"Maximum",Inf,"Fixed",false)
;

struct("Name","R_0","Unit","","Value",R_0_,"Minimum",0,"Maximum",Inf,"Fixed",true
);

struct("Name","T_0","Unit","","Value",T_0_,"Minimum",0,"Maximum",Inf,"Fixed",true
);
```

```
struct("Name","alpha","Unit","","Value",alpha_,"Minimum",0,"Maximum",Inf,"Fixed",
true);

struct("Name","ratio_rotor","Unit","","Value",ratio_rotor_,"Minimum",0,"Maximum",
Inf,"Fixed",true);
    ];
initial_state = [
    struct("Name","T1","Unit","","Value",T(1,1),"Minimum",-
Inf,"Maximum",Inf,"Fixed",true);
    struct("Name","T2","Unit","","Value",T(1,2),"Minimum",-
Inf,"Maximum",Inf,"Fixed",true);
    struct("Name","T3","Unit","","Value",T(1,3),"Minimum",-
Inf,"Maximum",Inf,"Fixed",true);
    struct("Name","T4","Unit","","Value",T(1,4),"Minimum",-
Inf,"Maximum",Inf,"Fixed",true);
    ];
init_sys = idnlgrey(file,order,parameters,initial_state);
```

identification with PEM

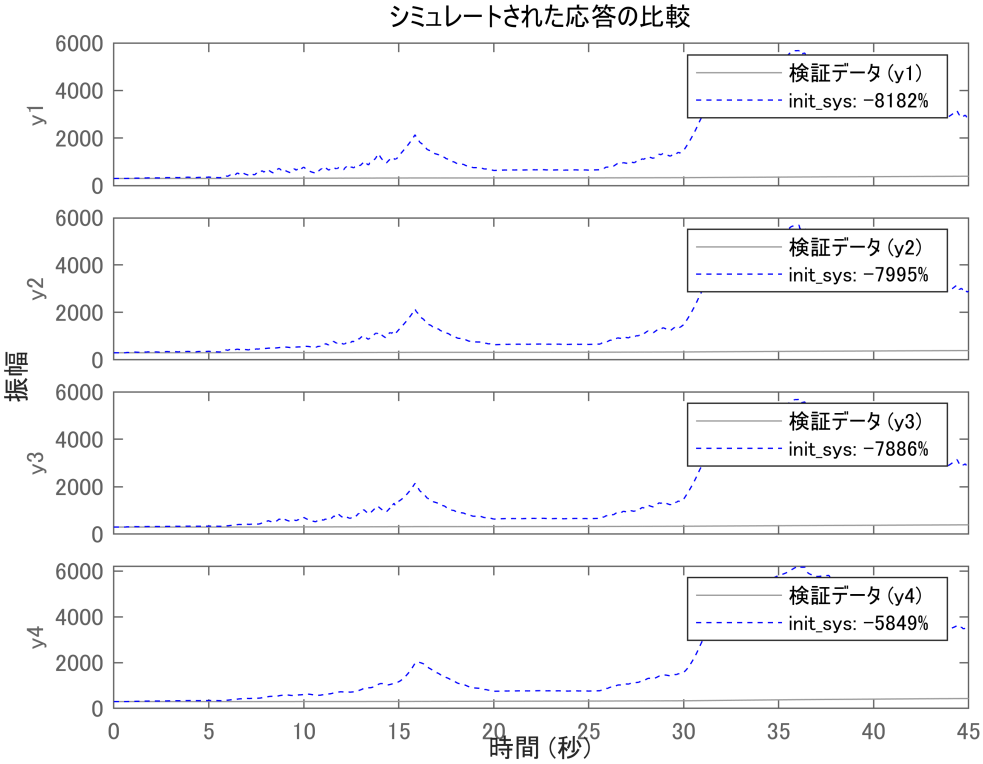
```
tic;
sys = pem(data,init_sys);
toc;
```

経過時間は 74.138863 秒です。

compare results

before identification

```
compare(data,init_sys,"--b");
```



after identification

```
compare(data,sys,"--r");
```