```
%================================================
% Modelspec.m
%   Define the Model of Kaihatsu and Kurozumi[2010]
%================================================
%
% close all;
% clear all;


para_names = {'sigma','theta','kai','inv_zeta',...
     'mu','phi_o_y','gamma_w','ksi_w', ...
     'gamma_p','ksi_p','phi_r','phi_pi','phi_y','z_star_bar','psi_bar', ...
     'eta','n_k','mu_E','r_E_bar', ...
     'rho_b','rho_g','rho_w','rho_p','rho_r','rho_nu','rho_z','rho_psi', ...
     'rho_efp','rho_nw', ...
     'sigma_b','sigma_g','sigma_w','sigma_p','sigma_r', ...
     'sigma_nu','sigma_z','sigma_psi','sigma_efp','sigma_nw'...
     'omega_c', 'gamma_p_m',  'gamma_p_x', 'ksi_p_m', 'ksi_p_x', 'phi_a', 'eta_c', 'eta_f' ...
     'rho_p_m', 'rho_p_x', 'rho_y_f', 'rho_r_f', 'rho_pi_f'};

syms sigma theta kai inv_zeta mu phi_o_y gamma_w ksi_w ...
     gamma_p ksi_p phi_r phi_pi phi_y z_star_bar psi_bar ...
     eta n_k mu_E r_E_bar ...
     rho_b rho_g rho_w rho_p rho_r rho_nu rho_z rho_psi ...
     rho_efp rho_nw ...
     sigma_b sigma_g sigma_w sigma_p sigma_r ...
     sigma_nu sigma_z sigma_psi sigma_efp sigma_nw

syms z_star psi l l_bar pii pi_bar r_n r_n_bar r_E c_y i_y ...
     delta alpha lambda_w lambda_i

syms c_t lambda_t w_t b_t Et_r_E_t1 q_t n_t r_k_t u_t ...
     mc_t pi_t pi_t_lg1 pi_t_lg2 ...
     y_t i_t k_t r_n_t y_star_t ...
     z_b_t z_g_t z_w_t z_p_t z_nu_t z_r_t z_z_t z_psi_t ...
     z_efp_t z_nw_t z_star_t l_t ...
     Et_c_t1 Et_lambda_t1 Et_w_t1 Et_q_t1 Et_r_k_t1 Et_pi_t1 Et_i_t1 ...
     Et_z_b_t1 Et_z_psi_t1 Et_z_star_t1

syms c_ta lambda_ta w_ta b_ta Et_r_E_t1a q_ta n_ta r_k_ta u_ta ...
     mc_ta pi_ta pi_t_lg1a pi_t_lg2a ...
     y_ta i_ta k_ta r_n_ta y_star_ta ...
     z_b_ta z_g_ta z_w_ta z_p_ta z_nu_ta z_r_ta z_z_ta z_psi_ta ...
     z_efp_ta z_nw_ta z_star_ta l_ta ...
     Et_c_t1a Et_lambda_t1a Et_w_t1a Et_q_t1a Et_r_k_t1a Et_pi_t1a ...
     Et_i_t1a Et_z_b_t1a Et_z_psi_t1a Et_z_star_t1a

syms eta_c eta_lambda eta_w eta_q eta_r_k eta_pi eta_i ...
     eta_z_b eta_z_psi eta_z_star

syms epsilon_b epsilon_g epsilon_w epsilon_p epsilon_nu epsilon_r ...
     epsilon_z epsilon_psi epsilon_efp epsilon_nw

syms  Et_r_n_t1 Et_r_n_t1a eta_r

```

```
% For Small Open
syms omega_c gamma_p_m gamma_p_x ksi_p_m ksi_p_x phi_a eta_cons eta_f ...
     rho_p_m rho_p_x rho_y_f rho_r_f rho_pi_f

syms Et_pi_d_t1 pi_d_t price_c_d_t y_f_t  price_x_f_t Et_pi_m_t1 pi_m_t mc_m_t z_p_m_t...
     Et_pi_x_t1 pi_x_t mc_x_t z_p_x_t Et_dS_t1 dS_t price_m_d_t r_f_t a_t e_t pi_f_t

syms  Et_pi_d_ta pi_d_ta price_c_d_ta y_f_ta  price_x_f_ta Et_pi_m_ta pi_m_ta mc_m_ta z_p_m_ta...
     Et_pi_x_ta pi_x_ta mc_x_ta z_p_x_ta Et_dS_ta dS_ta price_m_d_ta r_f_ta a_ta e_ta pi_f_ta

syms  y_f_y y_f cm  price_c_d price_m_c price_d_c

syms  eta_pi_m eta_pi_x eta_s epsilon_p_m epsilon_p_x epsilon_y_f epsilon_r_f epsilon_pi_f

parameters = [sigma; theta; kai; inv_zeta; mu; phi_y; gamma_w; ksi_w; ...
     gamma_p; ksi_p; phi_r; phi_pi; phi_y; z_star_bar; psi_bar; ...
     eta; n_k; mu_E; r_E_bar; ...
     rho_b; rho_g; rho_w; rho_p; rho_r; rho_nu; rho_z; rho_psi; ...
     rho_efp; rho_nw; ...
     sigma_b; sigma_g; sigma_w; sigma_p; sigma_r; ...
     sigma_nu; sigma_z; sigma_psi; sigma_efp; sigma_nw; ...
     %  ここから small open
     omega_c; gamma_p_m; gamma_p_x; ksi_p_m; ksi_p_x; phi_a; eta_cons; eta_f; ...
     rho_p_m; rho_p_x; rho_y_f; rho_r_f; rho_pi_f ];

%%  Endogenous Variables (54)  %2014/08/18 飯星修正
 Y_t = [c_t; lambda_t; w_t;  q_t;  r_k_t; u_t; ...
     mc_t; pi_t; pi_t_lg1; pi_t_lg2; ...
     y_t; i_t; k_t; r_n_t; y_star_t; ...
     z_b_t; z_g_t; z_w_t; z_p_t; z_nu_t; z_r_t; z_z_t; z_psi_t; ...
     z_star_t; l_t; ...
       Et_c_t1; Et_lambda_t1; Et_w_t1; Et_q_t1; Et_r_k_t1; Et_i_t1; ...
     Et_z_b_t1; Et_z_psi_t1; Et_z_star_t1...
%    ここから  small opne
     Et_pi_d_t1; pi_d_t; price_c_d_t; y_f_t;  price_x_f_t; Et_pi_m_t1; pi_m_t; ...
     mc_m_t; z_p_m_t; Et_pi_x_t1; pi_x_t; mc_x_t; z_p_x_t; Et_dS_t1; dS_t; price_m_d_t;...
     r_f_t; a_t; e_t; pi_f_t ];

%% Endogenous Variables(lagged) (54)  %2014/08/12 飯星修正
Y_ta = [c_ta; lambda_ta; w_ta; q_ta;  r_k_ta; u_ta; ...
     mc_ta; pi_ta; pi_t_lg1a; pi_t_lg2a; ...
     y_ta; i_ta; k_ta; r_n_ta; y_star_ta; ...
     z_b_ta; z_g_ta; z_w_ta; z_p_ta; z_nu_ta; z_r_ta; z_z_ta; z_psi_ta; ...
     z_star_ta; l_ta; ...
       Et_c_t1a; Et_lambda_t1a; Et_w_t1a; Et_q_t1a; Et_r_k_t1a;  Et_i_t1a; ...
    Et_z_b_t1a; Et_z_psi_t1a; Et_z_star_t1a...
    %    ここから  small opne
     Et_pi_d_ta; pi_d_ta; price_c_d_ta; y_f_ta;  price_x_f_ta; Et_pi_m_ta; pi_m_ta; ...
     mc_m_ta; z_p_m_ta; Et_pi_x_ta; pi_x_ta; mc_x_ta; z_p_x_ta; Et_dS_ta; dS_ta; price_m_d_ta;...
     r_f_ta; a_ta; e_ta; pi_f_ta ];

%% Forecast Errors (13)
Eta_t = [eta_c; eta_lambda; eta_w; eta_q; eta_r_k; eta_pi; eta_i; eta_z_b; eta_z_psi; ↙
eta_z_star;...
        eta_pi_m; eta_pi_x; eta_s];
```

```
110
111 %% Exogenous Shock Variables(13)
112 Epsilon_t = [epsilon_b; epsilon_g; epsilon_w; epsilon_p; epsilon_nu; ...
113      epsilon_r; epsilon_z; epsilon_psi; ...
114      epsilon_p_m; epsilon_p_x; epsilon_y_f; epsilon_r_f; epsilon_pi_f];
115
116  %% Structual Equations(25)
117 Eq_S1 = -lambda_t - 1/(1-theta*pii/r_n)*(sigma/(1-theta/z_star)* ...
118         (c_t-theta/z_star*(c_ta-z_star_t))-z_b_t) + ...
119         theta*pii/r_n/(1-theta*pii/r_n)*(sigma/(1-theta/z_star)* ...
120         (Et_c_t1+Et_z_star_t1-theta/z_star*c_t) - Et_z_b_t1);
121
122 Eq_S2 = -lambda_t+Et_lambda_t1-sigma*Et_z_star_t1+r_n_t-Et_pi_t1;
123
124 % Kew Keynesian Phillipse curve - Real Wage
125 Eq_S3 = -w_t+w_ta-pi_t+gamma_w*pi_ta-z_star_t+z_star*pii/r_n* ...
126       (Et_w_t1-w_t+Et_pi_t1-gamma_w*pi_t+Et_z_star_t1) +...
127       (1-ksi_w)*(1-ksi_w*z_star*pii/r_n)/ksi_w/(1+kai*(1+lambda_w)/lambda_w)*...
128       (kai*l_t-lambda_t-w_t+z_b_t) + z_w_t;
129
130 %Eq_S4 = -b_t + (1+lambda_i)/(1+lambda_i-n_k)*(q_t+k_t)+... %2014/08/10中村修正
131 %        (1-(1+lambda_i)/(1+lambda_i-n_k))*n_t;
132
133 %Eq_S5 = -Et_r_E_t1 + (1-(1-delta)/r_E/psi)*Et_r_k_t1+...   %2014/08/10中村修正
134 %        ((1-delta)/r_E/psi)*Et_q_t1 - q_t - Et_z_psi_t1;
135
136  Eq_S5 = -r_n_t + Et_pi_t1 + (1-(1-delta)/r_n/psi)*Et_r_k_t1+...
137         ((1-delta)/r_n/psi)*Et_q_t1 - q_t - Et_z_psi_t1;
138
139
140 % Eq_S6 = -Et_r_E_t1 + r_n_t - Et_pi_t1 - mu_E*(n_t-q_t-k_t) + z_efp_t;  %2014/08/10 飯星修正
141
142 % Eq_S7 = -z_star/eta/r_E*n_t + (1+lambda_i)/n_k*...    %2014/08/10 飯星修正
143 %         ((1-(1-delta)/r_E/psi)*r_k_t+(1-delta)/r_E/psi*q_t-q_ta-z_psi_t)-...
144 %         ((1+lambda_i)/n_k-1)*Et_r_E_t1a+ ...
145 %         n_ta - z_star_t + z_nw_t;
146
147 Eq_S8 = w_t + l_t - (r_k_t+u_t+k_ta-z_star_t-z_psi_t);
148 Eq_S9 = -u_t + mu*(r_k_t-q_t);
149
150 % Marginal Cost of Demestic Consumption Goods
151 Eq_S10 = -mc_t + (1-alpha)*w_t + alpha*r_k_t;
152
153 % Kew Keynesian Phillipse curve - Demestic Consumption Goods
154 Eq_S11 = -pi_d_t + gamma_p*pi_d_ta+z_star*pii/r_n*(Et_pi_d_t1-gamma_p*pi_d_t)+...
155          (1-ksi_p)*(1-ksi_p*z_star*pii/r_n)/ksi_p*mc_t+z_p_t;
156
157 Eq_S12 = -y_t + (1+phi_o_y)*((1-alpha)*l_t+alpha*(u_t+k_ta-z_star_t-z_psi_t));
158
159 % Resource Constraint (B11)
160 % Eq_S13 = -y_t + c_y*c_t + i_y*i_t + z_g_t;
161 Eq_S13 = -y_t + c_y*(1-omega_c)*price_c_d^(1-eta_cons)*(c_t+eta_cons*price_c_d_t) ...
162          + i_y*i_t + y_f_y*(y_f_t-eta_f*price_x_f_t)+ z_g_t;
163
164 Eq_S14 = -k_t + (1-delta-r_n*psi/pii)/z_star/psi*u_t+ ...
```

```
165          (1-delta)/z_star/psi*(k_ta-z_star_t-z_psi_t)+ ...
166          (1-(1-delta)/z_star/psi)*i_t;
167
168 Eq_S15 = -q_t + inv_zeta*(i_t-i_ta+z_star_t+z_psi_t)-...
169          inv_zeta*z_star*pii/r_n*(Et_i_t1-i_t+Et_z_star_t1+...
170          Et_z_psi_t1)+z_nu_t;
171
172 % Taylor Rule
173 Eq_S16 = -r_n_t + phi_r*r_n_ta+(1-phi_r)*...
174         (0.25*phi_pi*(pi_t+pi_t_lg1+pi_t_lg2+pi_t_lg2a)+...
175         phi_y*(y_t-y_star_t))+z_r_t;
176
177 Eq_S17 = -y_t+y_star_t+(1+phi_o_y)*((1-alpha)*l_t+alpha*(u_t+k_ta));
178
179 % Kew Keynesian Phillipse curve - Imported Consumption Goods (B2)
180 Eq_S18 = -pi_m_t + gamma_p_m*pi_m_ta+z_star*pii/r_n*(Et_pi_m_t1-gamma_p_m*pi_m_t)+...
181          (1-ksi_p_m)*(1-ksi_p_m*z_star*pii/r_n)/ksi_p_m*mc_m_t+z_p_m_t;
182
183 % Kew Keynesian Phillipse curve - Exported Consumption Goods (B4)
184 Eq_S19 = -pi_x_t + gamma_p_x*pi_x_ta+z_star*pii/r_n*(Et_pi_x_t1-gamma_p_x*pi_x_t)+...
185          (1-ksi_p_x)*(1-ksi_p_x*z_star*pii/r_n)/ksi_p_x*mc_x_t+z_p_x_t;
186
187 % Marginal Cost of Imported Consumption Goods (eq under B3)
188 Eq_S20 = -mc_m_t  -mc_x_t - price_x_f_t - price_m_d_t;
189
190 % Marginal Cost of Exported Consumption Goods (B21)
191 Eq_S21 = -mc_x_t + mc_x_ta + pi_d_t - pi_x_t - dS_t;
192
193 % UIP (B10)
194 Eq_S22 = -Et_dS_t1 - ( r_n_t - r_f_t) - phi_a*a_t;
195
196 % net foreign asset (B17)
197 Eq_S23 = -a_t - y_f*mc_x_t -eta_f*y_f*price_x_f_t + y_f*y_f_t + cm*e_t...
198     -cm*(-eta_cons*(1-omega_c)*price_c_d^(-1+eta_cons)*price_m_d_t+c_t) ...
199     + r_n/pii/z_star* a_ta;
200
201 % Real Exchange Rate (2.72)
202 Eq_S24 = -e_t + mc_x_t + price_x_f_t;
203
204 % Combination of Domestic and Imported Goods (eq under B22)
205 Eq_S25 = -pi_t + (1-omega_c)*(price_d_c)^(1-eta_cons)*pi_d_t...
206         + omega_c*(price_m_c)^(1-eta_cons)*pi_m_t;
207
208 % Relative Prices (B18)
209 Eq_S26 =  -price_m_d_t + price_m_d_ta + pi_m_t - pi_d_t;
210 Eq_S27 =  -price_x_f_t + price_x_f_ta + pi_x_t - pi_f_t;
211 Eq_S28 =  -price_c_d_t + price_c_d_ta + pi_t - pi_d_t;
212
213
214 %% Forecast Errors(13)
215 Eq_F1 = -c_t + Et_c_t1a + eta_c;
216 Eq_F2 = -lambda_t + Et_lambda_t1a + eta_lambda;
217 Eq_F3 = -w_t + Et_w_t1a + eta_w;
218 Eq_F4 = -q_t + Et_q_t1a + eta_q;
219 Eq_F5 = -r_k_t + Et_r_k_t1a + eta_r_k;
```

```
Eq_F6 = -pi_d_t + Et_pi_d_ta + eta_pi;  % 2014/08/18  修正
Eq_F7 = -i_t + Et_i_t1a + eta_i;
Eq_F8 = -z_b_t + Et_z_b_t1a + eta_z_b;
Eq_F9 = -z_psi_t + Et_z_psi_t1a + eta_z_psi;
Eq_F10 = -z_star_t + Et_z_star_t1a + eta_z_star;
% ここからSmall Open
Eq_F11 = -pi_m_t + Et_pi_m_ta + eta_pi_m; % 2014/08/18  追加
Eq_F12 = -pi_x_t + Et_pi_x_ta + eta_pi_x; % 2014/08/18  追加
Eq_F13 = -dS_t + Et_dS_ta + eta_s;  % 2014/08/18  追加

%% Persistent Shocks(13)
Eq_P1 = -z_b_t + rho_b*z_b_ta + epsilon_b;
Eq_P2 = -z_g_t + rho_g*z_g_ta + epsilon_g;
Eq_P3 = -z_w_t + rho_w*z_w_ta + epsilon_w;
Eq_P4 = -z_p_t + rho_p*z_p_ta + epsilon_p;
Eq_P5 = -z_nu_t + rho_nu*z_nu_ta + epsilon_nu;
Eq_P6 = -z_r_t + rho_r*z_r_ta + epsilon_r;
Eq_P7 = -z_z_t + rho_z*z_z_ta + epsilon_z;
Eq_P8 = -z_psi_t + rho_psi*z_psi_ta + epsilon_psi;
%Eq_P9 = -z_efp_t + rho_efp*z_efp_ta + epsilon_efp;
%Eq_P10 = -z_nw_t + rho_nw*z_nw_ta + epsilon_nw;
% ここからSmall Open
Eq_P11 = -y_f_t + rho_y_f*y_f_ta + epsilon_y_f;
Eq_P12 = -r_f_t + rho_r_f*r_f_ta + epsilon_r_f;
Eq_P13 = -z_p_m_t + rho_p_m*z_p_m_ta + epsilon_p_m;
Eq_P14 = -z_p_x_t + rho_p_x*z_p_x_ta + epsilon_p_x;
Eq_P15 = -pi_f_t + rho_pi_f*pi_f_ta + epsilon_pi_f;

%% Identities(3)
Eq_I1 = -z_star_t + z_z_t + alpha/(1-alpha)*z_psi_t;
Eq_I2 = -pi_t_lg1 + pi_ta;
Eq_I3 = -pi_t_lg2 + pi_t_lg1a;

%% n.eq = 54
System_of_Eq = [Eq_S1; Eq_S2; Eq_S3;  Eq_S5; Eq_S8; Eq_S9; Eq_S10; ...
  Eq_S11; Eq_S12; Eq_S13; Eq_S14; Eq_S15; ...
  Eq_S16; Eq_S17; ...
  Eq_S18; Eq_S19; Eq_S20; Eq_S21; Eq_S22; Eq_S23; Eq_S24; Eq_S25; Eq_S26; Eq_S27; Eq_S28; ...  %↙
Small Open
  Eq_F1; Eq_F2; Eq_F3; Eq_F4; Eq_F5; ...
  Eq_F6; Eq_F7; Eq_F8; Eq_F9; Eq_F10; ...
  Eq_F11; Eq_F12; Eq_F13; ... % Small Open
  Eq_P1; Eq_P2; Eq_P3; Eq_P4; Eq_P5; ...
  Eq_P6; Eq_P7; Eq_P8;  ...
  Eq_P11; Eq_P12; Eq_P13; Eq_P14; Eq_P15; ... % Small Open
  Eq_I1; Eq_I2; Eq_I3];

npara = length(parameters);
neq  = length(System_of_Eq);  %  Num of stable and unstable Variables
nshock = length(Epsilon_t);
nend = length(Eta_t);         %  Num of Unstable Variables

C = zeros(neq,1);
GAM0j = -jacobian(System_of_Eq, Y_t);
GAM1j = jacobian(System_of_Eq, Y_ta);
```

```
274 PSI0j = jacobian(System_of_Eq, Epsilon_t);
275 PPIj  = jacobian(System_of_Eq, Eta_t);
276
277 %---------------------------------------
278 % output system matrix in fortran form
279 %---------------------------------------
280
281  fortran(GAM0j)
282  fortran(GAM1j)
283  fortran(PSI0j)
284  fortran(PPIj)
285
286 % z_star_t = z_z_t + alpha/(1-alpha)/z_psi_t
287 % z_g_t_tilde = z_g_t/(1-c_y-i_y)
288 % z_nw_t_tilde = z_nw_t/(1-z_star/r_E)
289
290 % c_y:   sample mean
291 % i_y:   sample mean
292 % l_bar:   sample mean
293 % r_n_bar: sample mean
294 % pi_bar: 1/4 for Japan
295
296 % z_star_bar : parameter
297 % psi_bar : parameter
298 % r_E_bar : parameter
299
300 % z_star = exp(0.01*z_star_bar);
301 % psi =exp(0.01*psi_bar);
302 % l = exp(0.01*l_bar);
303 % pii = exp(0.01*pi_bar);
304 % r_n = exp(0.01*r_n_bar);
305 % r_E = exp(0.01*r_E_bar);
306
307 % delta = 0.06
308 % alpha = 0.37
309 % lambda_w = 0.2
310 % lambda_i = 0.2
311
312 %---------------------------
313 % Solve the model by gensys
314 %---------------------------
315
316 addpath('./gensys');
317
318 % pos. mean of tab.2, p.28
319 sigma = 1.107;
320 theta = 0.481;
321 kai = 3.857;
322 inv_zeta = 0.578;
323 mu = 0.955;
324 phi_o_y = 0.083;
325 gamma_w = 0.311;
326 ksi_w = 0.477;
327 gamma_p = 0.446;
328 ksi_p = 0.660;
```

```
329 phi_r = 0.577;
330 phi_pi = 1.804;
331 phi_y = 0.088;
332 z_star_bar = 0.352;
333 psi_bar = 0.427;
334 eta = 0.967;
335  n_k = 0.490;
336 mu_E = 0.029;
337 % r_E_bar = 1.337;
338
339 rho_b = 0.575;
340 rho_g = 0.960;
341 rho_w = 0.239;
342 rho_p = 0.982;
343 rho_r = 0.579;
344 rho_nu = 0.934;
345 rho_z = 0.069;
346 rho_psi = 0.169;
347 % small open
348 rho_p_m = 0.9;
349 rho_p_x = 0.9;
350 rho_y_f = 0.9;
351 rho_r_f = 0.9;
352 rho_pi_f = 0.9;
353 omega_c = 0.2;
354 gamma_p_m = 0.5;
355 gamma_p_x = 0.5;
356 ksi_p_m   = 0.6;
357 ksi_p_x = 0.6;
358 phi_a = 0.1;
359 eta_cons = 0.5;
360 eta_f = 0.5;
361 % rho_efp = 0.966;
362 % rho_nw = 0.804;
363
364 % sigma_b = 2.029;
365 % sigma_g = 0.589;
366 % sigma_w = 0.584;
367 % sigma_p = 0.185;
368 % sigma_r = 0.133;
369 % sigma_nu = 1.335;
370 % sigma_z = 1.715;
371 % sigma_psi = 1.351;
372 % sigma_efp = 0.197;
373 % sigma_nw = 1.577;
374
375 delta = 0.06;
376 alpha = 0.37;
377 lambda_w = 0.2;
378 lambda_i = 0.2;
379
380 c_y = 1 - alpha;
381 i_y = alpha;
382 % l_bar = 1.0;
383 r_n_bar= 1.0;
```

```
384 pi_bar = 0.25;
385
386 z_star = exp(0.01*z_star_bar);
387 psi =exp(0.01*psi_bar);
388 % l = exp(0.01*l_bar);
389 pii = exp(0.01*pi_bar);
390 r_n = exp(0.01*r_n_bar);
391 % r_E = exp(0.01*r_E_bar);
392
393 cm = 0.1 ;
394 y_f_y = 0.10;
395 y_f = 0.0;
396 price_c_d = 1;
397 price_m_c = 1;
398 price_d_c = 1;
399
400 GAM0 = eval(GAM0j);
401 GAM1 = eval(GAM1j);
402 PSI0 = eval(PSI0j);
403 PPI  = eval(PPIj);
404
405 [T1,TC,T0,fmat,fwt,ywt,gev,RC,loose] = gensys(GAM0,GAM1,C,PSI0,PPI,1);
406
407 %-------------------
408 % Impulse Response
409 %-------------------
410
411 Z0 = [z_star_t + y_t - y_ta;
412       z_star_t + c_t - c_ta;
413       z_star_t + z_psi_t + i_t - i_ta;
414       z_star_t + w_t - w_ta;
415       l_t;
416       pi_t;
417       -z_psi_t + z_nu_t - z_nu_ta;
418       r_n_t;
419       y_t - y_star_t;
420       z_star_t + b_t - b_ta;
421       k_t - k_ta + z_star_t + z_psi_t;
422       n_t - n_ta + z_star_t;
423       q_t - q_ta - z_psi_t;
424       r_n_t - Et_pi_t1];
425
426 nvar = size(Z0, 1);
427 % nirf = 40;
428 Z = jacobian(Z0, Y_t);
429 Zlg = jacobian(Z0, Y_ta);
430 ZZ = [Z,Zlg];
431
432 ZZ1 = eval(ZZ);
433
434 sig_chol = eye(nshock);
435
436 titlestr = {'Zb :', 'Zg :', 'Zw :', 'Zp :', 'Z_¥nu :',...
437             'Zr :', 'Zz :', 'Z_¥phi :', 'Zefp :', 'Znw :'};
438
```

```
439 ystr = {'Yt', 'Ct', 'It', 'Wt', 'Lt', 'Pt', 'Pi/Pt',...
440         'R_nt', 'Yt/Ystar', 'Bt','Kt','Nt','Qt','R^E_t'};
441
442   yyirf_total2  = zeros(nirf,nvar,nshock);   % 2014/08/10 追加
443
444 for sh_ind = 1:8  % nshock
445
446 %   figure('Name', 'Impulse Responses of Structual Shock' ); % 2014/08/10 修正
447 % figure('Name',strcat(titlestr(sh_ind)) );
448
449     impact = sig_chol(:,sh_ind);
450     yyirf  = zeros(nirf,nvar);
451     dyyirf  = zeros(nirf,nvar);
452     ss = T0*impact;
453     s  = [ss;zeros(size(ss,1),1)];
454     dyyirf(1,:) = ZZ*s;
455     yyirf(1,:) = dyyirf(1,:);
456
457     for t = 2:nirf
458         ss1 = T1*ss;
459         s = [ss1;ss];
460         dyyirf(t,:) = (ZZ*s)';
461         yyirf(t,1:4) = yyirf(t-1,1:4)+dyyirf(t,1:4);
462         yyirf(t,5:13) = dyyirf(t,5:13);              %2014.8.15中村修正
463         ss = ss1;
464     end
465 %    for j = 1:9
466 %        subplot(3, 3, j); % 2014/08/10 追加
467 %        plot(1:nirf, yyirf(:,j),'b')
468 %        title(strcat(titlestr(sh_ind),ystr(j)))
469 %    end
470
471     yyirf_total2(:,:,sh_ind)  = yyirf;   % 2014/08/10 追加
472
473 %  display('press any key to change to next graph');
474 %   w = waitforbuttonpress;
475 end
```