Main>OptimizationFunction (Calls: 139, Time: 3.398 s)

Parents (calling functions)

Function Name	Function Type	Calls
Main	Script	40
Main>@(delta_V_S)OptimizationFunction(delta_V_S)	Anonymous function	99

Lines that take the most time

Line Number	Code	Calls	Total Time (s)	% Time	Time Plot
194	`[t, out, te,ye,ie] = ode45(@(t,input)ODEFUN(t, i…`	139	3.300	97.1%	▬▬▬▬
192	`options = odeset('Events', @myevents, 'RelTol', …`	139	0.067	2.0%	|
211	`fprintf('returned to earth \n');`	58	0.011	0.3%	
208	`fprintf('Hit moon bad \n');`	81	0.009	0.3%	
216	`end`	139	0.003	0.1%	
All other lines			0.007	0.2%	
Totals			3.398	100%	

Children (called functions)

Function Name	Function Type	Calls	Total Time (s)	% Time	Time Plot
ode45	Function	139	3.284	96.7%	▬▬▬▬
odeset	Function	139	0.063	1.9%	|
mpower	Function	2	0.000	0.0%	
Self time (built-ins, overhead, etc.)			0.051	1.5%	|
Totals			3.398	100%	

Code Analyzer results

Line Number	Message
157	The value assigned to variable 'mS' might be unused.
158	The value assigned to variable 'rM' might be unused.
159	The value assigned to variable 'rE' might be unused.
160	The value assigned to variable 'dEM' might be unused.
194	The value assigned here to 't' appears to be unused. Consider replacing it by ~.
194	The value assigned here to 'out' appears to be unused. Consider replacing it by ~.
194	The value assigned here to 'te' appears to be unused. Consider replacing it by ~.
194	The value assigned here to 'ye' appears to be unused. Consider replacing it by ~.

Coverage results

Show coverage for parent folder

Total lines in function	65
Non-code lines (comments, blank lines)	21
Code lines (lines that can run)	44
Code lines that did run	43
Code lines that did not run	1
Coverage (did run/can run)	97.73 %

Function listing

```
Time    Calls    Line

              152    function result = OptimizationFunction(delta_V_S)
              153    % Constants
```

```matlab
< 0.001      139   154   G=6.67*10^(-11);
< 0.001      139   155   mM = 7.34767309*10^22; % mass of moon in kg
< 0.001      139   156   mE = 5.97219*10^24; % mass of Earth kg
< 0.001      139   157   mS = 28833; % mass of spacecraft in kg
< 0.001      139   158   rM = 1737100; %radius of moon in m
< 0.001      139   159   rE = 6371000; %radius of the Earth in m
< 0.001      139   160   dEM=384403000; %distance from Earth to moon in m
             161
             162   % Initial Conditions
             163
             164   %Reset initial conditions
< 0.001      139   165   dES_0 = 340000000;
< 0.001      139   166   vS_0 = 1000;
< 0.001      139   167   theta_s = 50;
< 0.001      139   168   xS_0 = dES_0 * cosd(theta_s);
< 0.001      139   169   yS_0 = dES_0 * sind(theta_s);
< 0.001      139   170   vSx_0 = vS_0 * cosd(theta_s);
< 0.001      139   171   vSy_0 = vS_0 * sind(theta_s);
             172
             173
             174
< 0.001      139   175   dEM_0 = 384403000;
< 0.001      139   176   vM_0 = sqrt((G*mE^2)/((mE+mM)*dEM_0));
< 0.001      139   177   theta_m = 42.5;
< 0.001      139   178   xM_0 = dEM_0 * cosd(theta_m);
< 0.001      139   179   yM_0 = dEM_0 * sind(theta_m);
< 0.001      139   180   vMx_0 = -vM_0 * sind(theta_m);
< 0.001      139   181   vMy_0 = vM_0 * cosd(theta_m);
             182
< 0.001      139   183   xE_0 = 0;
< 0.001      139   184   yE_0 = 0;
< 0.001      139   185   vEx_0 = 0;
< 0.001      139   186   vEy_0 = 0;
             187
             188   % Declare initial condition vector with added delta V
< 0.001      139   189   IC = [xS_0, yS_0, vSx_0 + delta_V_S(1), vSy_0+ delta_V_S(2), xM_0, yM_0, vMx_0, vMy_0, xE_0, yE_0, vEx_0, vEy_0]'
             190
             191   % ODE CALL
  0.067      139   192   options = odeset('Events', @myevents, 'RelTol', 1e-8, 'MaxStep', 1e5);  % custom options
< 0.001      139   193   tspan = [0, 10^10];       %integration tspan
  3.300      139   194   [t, out, te,ye,ie] = ode45(@(t,input)ODEFUN(t, input),tspan, IC, options);
             195   % [t,out] = ode45(@(t,input) ODEFUN(t,input),tspan,IC,options);
             196
             197   % if simulation results in the spaceship returning back to earth, return
             198   % the total delta V that resulted in that successful simulation, otherwise
             199   % return very high value
< 0.001      139   200   if ie==2
< 0.001       58   201       result = sqrt(delta_V_S(1)^2 + delta_V_S(2)^2);  % Magnitude of delta_V_S vector
< 0.001       81   202   else
< 0.001       81   203       result=100000;
< 0.001      139   204   end
             205
             206
< 0.001      139   207   if ie==1
  0.009       81   208       fprintf('Hit moon bad \n');
< 0.001      139   209   end
< 0.001      139   210   if ie==2
  0.011       58   211       fprintf('returned to earth \n');
< 0.001      139   212   end
< 0.001      139   213   if ie==3
             214       fprintf('Lost boi \n');
< 0.001      139   215   end
  0.003      139   216   end
```

Local functions in this file are not included in this listing.