

## Rainy Lake Simulation Model

Use this script to load the simulation data for the Simulink model Rainy\_Lake\_Simulation\_Model.slx and display the results. The script loads historical inflow, outflow, and height data from RLEstimates.csv located in an accompanying data directory.

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### Load Data

```

if exist('RLEstimates.mat')
    load 'RLEstimates.mat';
else
    RLTable = readtable('./data/RLEstimates.csv');
    save './data/RLEstimates.mat' RLTable
end

dates = datenum(RLTable(:,1));
H = RLTable(:,2);
I = RLTable(:,3);
O = RLTable(:,4);

I = [(1:length(I))', I];
H = [(1:length(H))', H];
O = [(1:length(O))', O];

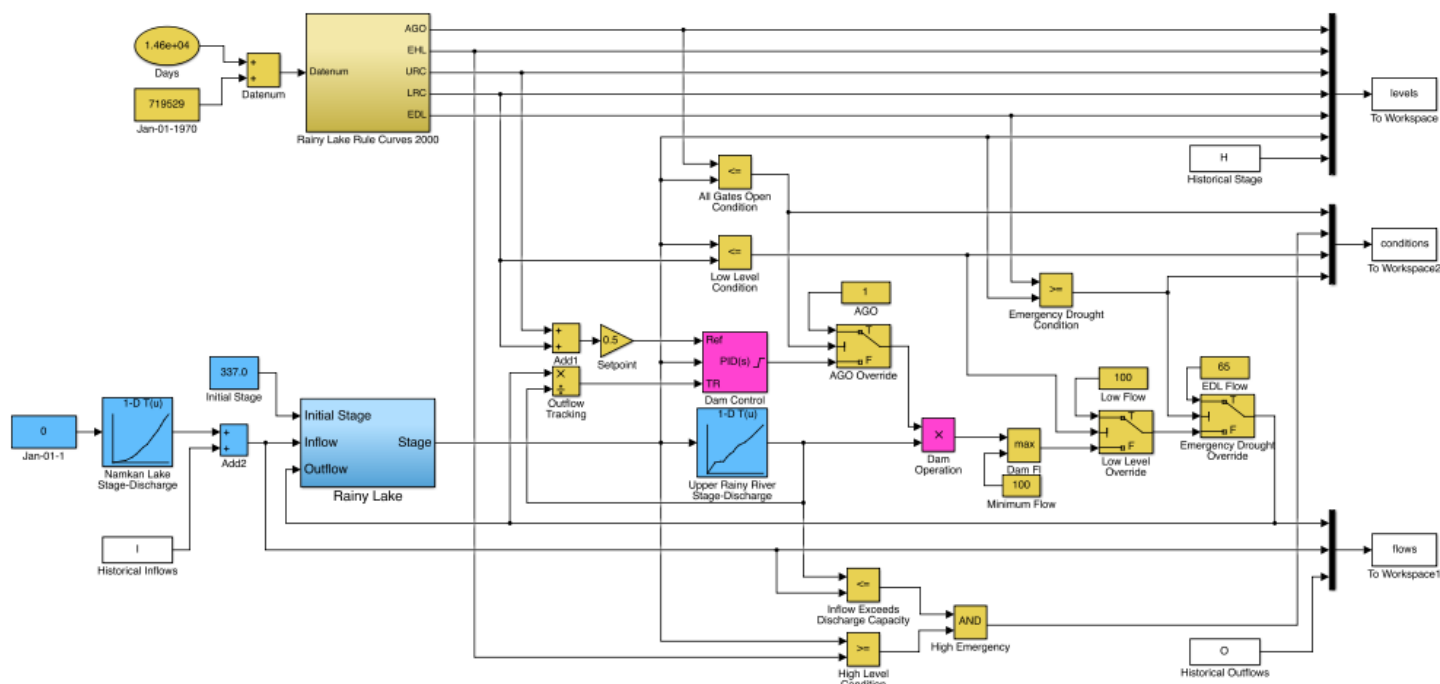
```

### Run Simulation

```

Rainy_Lake_Simulation_Model;
set_param('Rainy_Lake_Simulation_Model', 'IgnoredZcDiagnostic', 'none');
sim('Rainy_Lake_Simulation_Model');

```



### Plot Results

```

t = levels.Time + datenum('Jan-01-1970');
ago = levels.Data(:,1);
ehl = levels.Data(:,2);
urc = levels.Data(:,3);
lrc = levels.Data(:,4);
edl = levels.Data(:,5);
rlest = levels.Data(:,6);
rlhist = levels.Data(:,7);

```

```

figure(1)
subplot(2,1,1);
plot(t,urc,'g', ...
t,lrc,'g', ...
t,ago,'g', ...
t,ehl,'g', ...
t,edl,'g');
hold on;
plot(t,rlest,'r');
hold off;

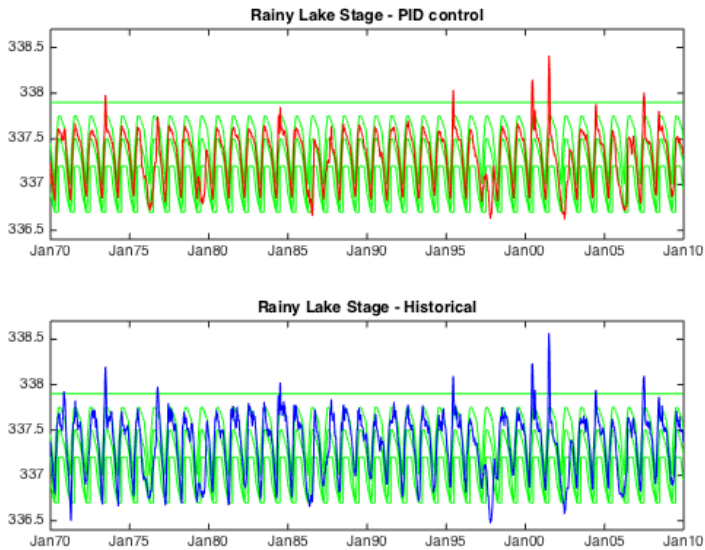
datetick('x',12)
ylim([336.4,338.7])
title('Rainy Lake Stage - PID control');

subplot(2,1,2);
plot(t,urc,'g',t,lrc,'g',t,ago,'g',t,edl,'g');
hold on;
plot(t,rlhist,'b');
hold off;

datetick('x',12)
ylim([336.4,338.7])
title('Rainy Lake Stage - Historical');

print -dpng -r300 images/Rainy_Lake_Simulation_Results

```



figure(2) scatter(rlest,rlhist) hold on plot([336.4 338.8],[336.4 338.8]) hold off