

Figure B.1 (a) Planar four-bar mechanism and (b) output variables.

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%-----
% Here, values for the planar 4-bar mechanism variables W1, V1,
% G1, U1 and L1 are assigned.

W1 = 0.5*exp(i*90*pi/180);
V1 = 0.75*exp(i*19.3737*pi/180);
G1 = 0.75 + i*0;
U1 = 0.75*exp(i*93.2461*pi/180);
L1 = 0.5*exp(-i*60.7834*pi/180);
%-----

%-----
% Here, values for the start, step and stop displacement angles
% for the crank link are assigned.

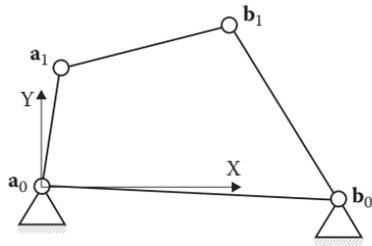
start_ang = 0;
step_ang  = 1;
stop_ang  = 360;
%-----

%-----
% Here, values for crank link angular velocity and angular
% acceleration are assigned.

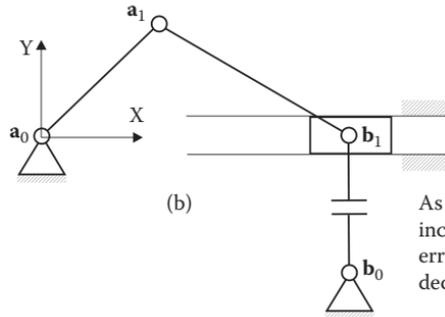
angular_vel = 1.0*ones(N,1);
angular_acc = 0.1*ones(N,1);
%-----

```

Figure B.2 Sections of *Kinematic_Planar_4Bar.m* with sample values in bold.



(a)



(b)

As the distance b_0-b_1 increases, the translation error of the slider (b_1) decreases.

Figure B.3 (a) Planar four-bar and (b) slider-crank mechanism fixed and moving pivots.

```
%-----  
% Here, values for the planar 4-bar or slider-crank mechanism  
% variables a0, a1, b0 and b1 are assigned.  
  
a0=[0, 0]';  
a1=[0, 1]';  
b0=[2.5, 0]';  
b1=[2.5, -100000]';  
%-----
```

Figure B.4 Section of *Centroides.m* with sample values in bold.

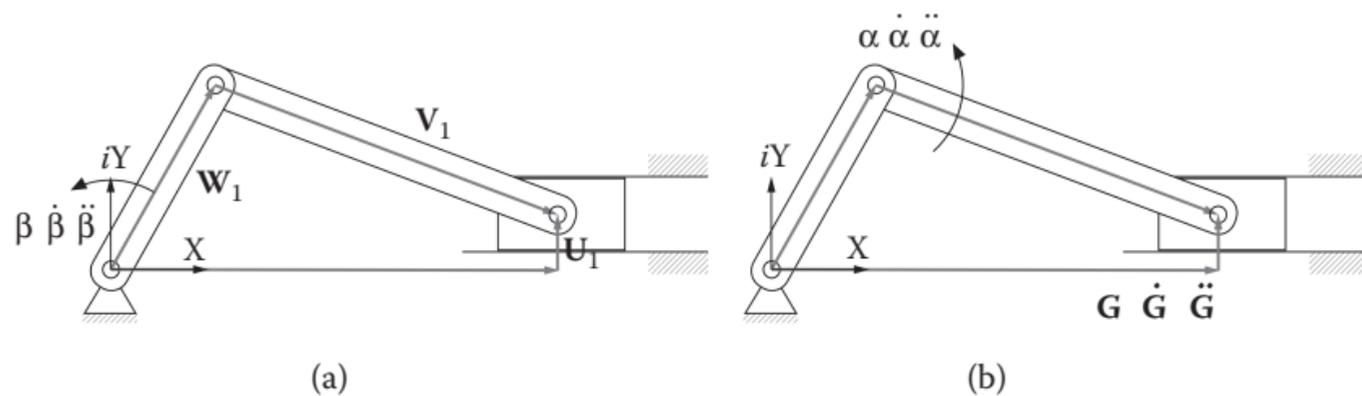


Figure B.5 (a) Slider-crank mechanism and (b) output variables.

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%-----
% Here, values for the slider-crank mechanism variables W1, U1,
% V1 are assigned and variable G1 calculated. Variables LW1,
% LU1 and LV1 are the scalar lengths of vectors W1, U1 and V1.

LW1 = 1;
theta = 45*pi/180;
W1 = LW1*exp(i*theta);

LU1 = 0;
U1 = i*LU1;

LV1 = 1.5;
rho = asin((LU1-LW1*sin(theta))/LV1);
V1 = LV1*exp(i*rho);

G1 = W1 + V1 - U1;
%-----

%-----
% Here, values for the start, step and stop displacement angles
% for the crank link are assigned.

start_ang = 0;
step_ang = 1;
stop_ang = 360;
%-----

%-----
% Here, values for crank link angular velocity and angular
% acceleration are assigned.

angular_vel = 100*ones(N+1,1);
angular_acc = 10*ones(N+1,1);
%-----

```

Figure B.6 Sections of *Kinematic_Slider_Crank.m* with sample values in bold.

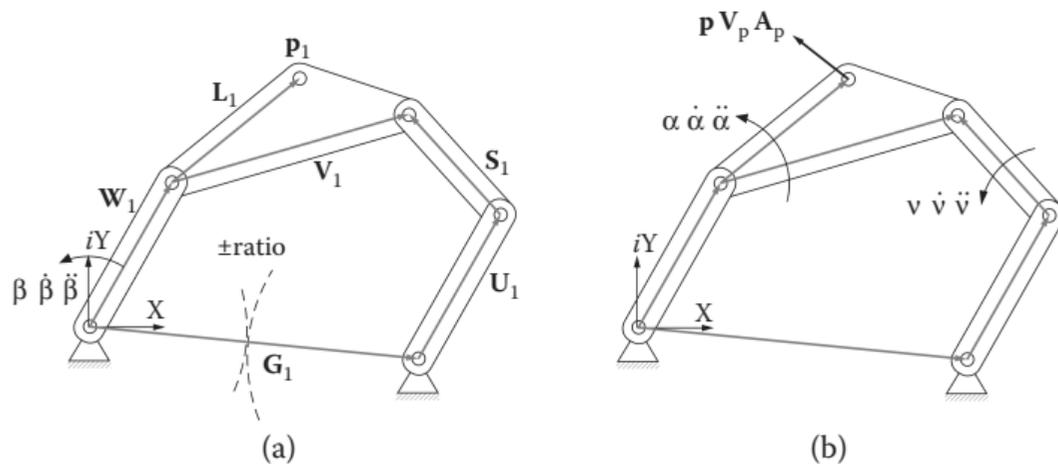


Figure B.7 (a) Geared five-bar mechanism and (b) output variables.

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%-----
% Here, values for the geared 5-bar mechanism variables W1, V1,
% G1, U1, L1, S1 and gear ratio are assigned. Only negative
% gear ratio values should be specified.

W1 = 0.5*exp(i*90*pi/180);
V1 = 0.75*exp(i*32.7304*pi/180);
G1 = 0.75 + i*0;
U1 = 0.75*exp(i*45*pi/180);
L1 = 0.5*exp(-i*74.1400*pi/180);
S1 = 0.75*exp(i*149.9847*pi/180);
ratio = 2;
%-----

%-----
% Here, values for the start, step and stop displacement angles
% for the crank link are assigned.

start_ang = 0;
step_ang   = 1;
stop_ang   = 360;
%-----

%-----
% Here, values for crank link angular velocity and angular
% acceleration are assigned.

angular_vel = 1*ones(N,1);
angular_acc = 0.1*ones(N,1);
%-----

```

Figure B.8 Sections of *Kinematic_Geared_5Bar.m* with sample values in bold.


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%-----
% Here, values for the Watt II mechanism variables W1, V1, G1,
% U1, L1, W1s, V1s, G1s, U1s and L1s are assigned.

W1 = 0.5*exp(i*90*pi/180);
V1 = 0.75*exp(i*19.3737*pi/180);
G1 = 0.75 + i*0;
U1 = 0.75*exp(i*93.2461*pi/180);
L1 = 0.5*exp(-i*60.7834*pi/180);

W1s = 0.5*exp(i*45*pi/180);
V1s = 0.75*exp(i*7.9416*pi/180);
G1s = 0.7244 - i*0.1941;
U1s = 0.75*exp(i*60.2717*pi/180);
L1s = 0.5*exp(i*49.3512*pi/180);
%-----

%-----
% Here, values for the start, step and stop displacement angles
% for the crank link are assigned.

start_ang = 0;
step_ang  = -1;
stop_ang  = -360;
%-----

%-----
% Here, values for crank link angular velocity and angular
% acceleration are assigned.

angular_vel = -1.5*ones(N,1);
angular_acc = -0.25*ones(N,1);
%-----

```

Figure B.10 Sections of *Kinematic_Watt_II.m* with sample values in bold.

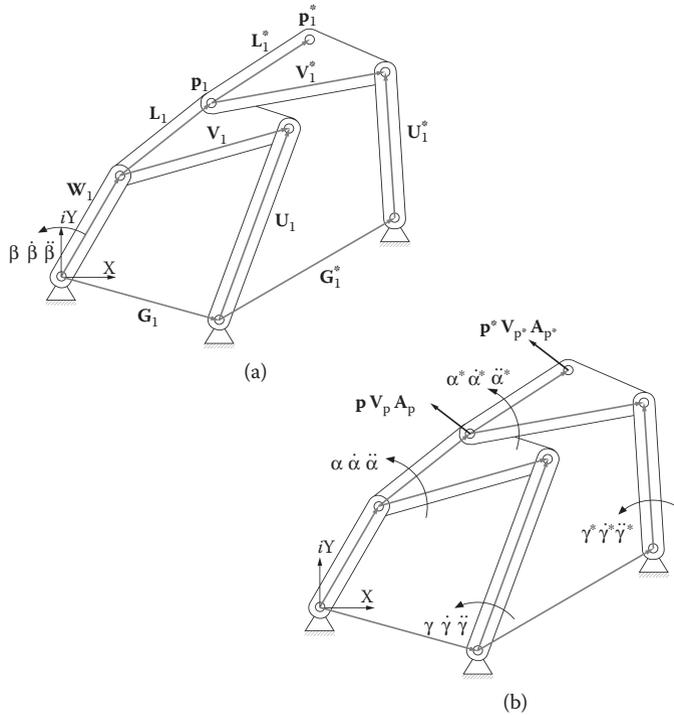


Figure B.11 (a) Stephenson III mechanism and (b) output variables.

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%-----
% Here, values for the Stephenson III mechanism variables W1,
% V1, G1, U1, L1, V1s, G1s, U1s and L1s are assigned.

W1 = 0.5*exp(i*90*pi/180);
V1 = 0.75*exp(i*19.3737*pi/180);
G1 = 0.75 + i*0;
U1 = 0.75*exp(i*93.2461*pi/180);
L1 = 0.5*exp(-i*60.7834*pi/180);

V1s = 1*exp(i*17.1417*pi/180);
G1s = 0.2159 + i*0.2588;
U1s = 1*exp(i*76.4844*pi/180);
L1s = 0.5*exp(i*63.7091*pi/180);
%-----

%-----
% Here, values for the start, step and stop displacement angles
% for the crank link are assigned.

start_ang = 0;
step_ang = -1;
stop_ang = -360;
%-----

%-----
% Here, values for crank link angular velocity and angular
% acceleration are assigned.

angular_vel = -1*ones(N,1);
angular_acc = -0.25*ones(N,1);
%-----

```

Figure B.12 Sections of *Kinematic_Stephenson_III.m* with sample values in bold.