

Condiciones iniciales:

```
x0 = [0;pi;0;0;0];  
u0 = 0;  
y0 = [0;0;0;0;0];
```

Variables fijas:

```
xf = 1;  
uf = [];  
yf = [];
```

Cálculo Punto de operación en Theta = Pi.

```
[x_op,u_op,y_op] = trim("trim_simulation",x0,u0,y0,xf,uf,yf)
```

```
x_op = 5×1  
    0  
    3.1416  
    0  
    0  
    0  
u_op = 0  
y_op = 5×1  
    0  
    3.1416  
    0  
    0  
    0
```

Cálculo de las matrices de espacio de estados.

```
[A,B,C,D] = linmod("trim_simulation",x_op,u_op)
```

```
A = 5×5  
    0    0    1.0000    0    0  
    0    0    0    1.0000    0  
    0    1.1278    0    0    0  
    0    2.2193    0    0    0  
    0    0   -0.0306    0   -0.2158  
B = 5×1  
    0  
    0  
   -0.2667  
   -0.7913  
    0.0232  
C = 5×5  
    1.0000    0    0    0    0  
    0    1.0000    0    0    0  
    0    0    1.0000    0    0  
    0    0    0    0    1.0000  
    0    0    0    0    0  
D = 5×1  
    0  
    0
```

```
0
0
0
```

## Observabilidad

```
observabilidad = rank(observ(A,C))
```

```
observabilidad = 5
```

## Controlabilidad

```
controlabilidad1 = rank(ctrb(A,B))
```

```
controlabilidad1 = 5
```

## Polos

```
polos_1 = eig(A)
```

```
polos_1 = 5×1
    0
 -0.2158
    0
  1.4897
 -1.4897
```