

```
In[1]:= Needs["IdentifiabilityAnalysis`"]
        startTime = AbsoluteTime[]
```

```
Out[2]= 3.6879518830351640 × 109
```

```
In[3]:= vars = {x1, x2, x3, x4, x5}
```

```
Out[3]= {x1, x2, x3, x4, x5}
```

```
In[4]:= params = {k1, k2, k3, k4, kM, S1, S2, S3, S4, S5}
```

```
Out[4]= {k1, k2, k3, k4, kM, S1, S2, S3, S4, S5}
```

```
In[5]:= sys = {x1'[t] == -k1 * x1[t] * u1[t] / (x1[t] + kM),
               x2'[t] == k1 * x1[t] * u1[t] / (x1[t] + kM) - k2 * x2[t] * u2[t] / (x2[t] + kM),
               x3'[t] == k2 * x2[t] * u2[t] / (x2[t] + kM) - k3 * x3[t] * u3[t] / (x3[t] + kM),
               x4'[t] == k2 * x2[t] * u2[t] / (x2[t] + kM) +
                   k3 * x3[t] * u3[t] / (x3[t] + kM) - k4 * x4[t] * u4[t] / (x4[t] + kM),
               x5'[t] == k4 * x4[t] * u5[t] / (x4[t] + kM),
               x1[0] == S1, x2[0] == S2, x3[0] == S3, x4[0] == S4, x5[0] == S5}
```

```
Out[5]= {x1'[t] == -  $\frac{k1 u1[t] x1[t]}{kM + x1[t]}$ , x2'[t] ==  $\frac{k1 u1[t] x1[t]}{kM + x1[t]}$  -  $\frac{k2 u2[t] x2[t]}{kM + x2[t]}$ ,
          x3'[t] ==  $\frac{k2 u2[t] x2[t]}{kM + x2[t]}$  -  $\frac{k3 u3[t] x3[t]}{kM + x3[t]}$ ,
          x4'[t] ==  $\frac{k2 u2[t] x2[t]}{kM + x2[t]}$  +  $\frac{k3 u3[t] x3[t]}{kM + x3[t]}$  -  $\frac{k4 u4[t] x4[t]}{kM + x4[t]}$ , x5'[t] ==  $\frac{k4 u5[t] x4[t]}{kM + x4[t]}$ ,
          x1[0] == S1, x2[0] == S2, x3[0] == S3, x4[0] == S4, x5[0] == S5}
```

```
In[6]:= controls = {u1, u2, u3, u4, u5}
```

```
Out[6]= {u1, u2, u3, u4, u5}
```

```
In[7]:= output = {x1[t], x2[t], x3[t], x4[t], x5[t]}
```

```
Out[7]= {x1[t], x2[t], x3[t], x4[t], x5[t]}
```

```
In[8]:= iad = IdentifiabilityAnalysis[{sys, output}, vars, params, t, controls]
```

```
Out[8]= IdentifiabilityAnalysisData[True, <>]
```

```
In[9]:= iad["IdentifiableQ"]
```

```
Out[9]= True
```

```
In[10]:= iad["DegreesOfFreedom"]
```

```
Out[10]= 0
```

```
In[11]:= iad["NonIdentifiableParameters"]
```

```
Out[11]= {}
```

```
In[12]:= endTime = AbsoluteTime[]
        N[endTime - startTime]
```

```
Out[12]= 3.6879518837211211 × 109
```

```
Out[13]= 0.685957
```