

```
In[14]:= Needs["IdentifiabilityAnalysis`"]
        startTime = AbsoluteTime[]
```

```
Out[15]:= 3.6878020383067895 × 109
```

```
In[16]:= vars = {x1, x2, x3, x4, x5}
```

```
Out[16]:= {x1, x2, x3, x4, x5}
```

```
In[17]:= params = {a1, a2, b1, b2, ka, kc, vm, c0, g}
```

```
Out[17]:= {a1, a2, b1, b2, ka, kc, vm, c0, g}
```

```
In[18]:= sys = {x1'[t] == -a1*(x1[t] - x2[t]) - ka*vm*x1[t]*x5[t],
               x2'[t] == a2*(x1[t] - x2[t]),
               x3'[t] == -b1*(x3[t] - x4[t]) - kc*vm*x3[t]*x5[t],
               x4'[t] == b2*(x3[t] - x4[t]),
               x5'[t] == ka*x5[t]^2*(a1*(x1[t] - x2[t]) + ka*vm*x1[t]*x5[t]) +
               kc*x5[t]^2*(b1*(x3[t] - x4[t]) + kc*vm*x3[t]*x5[t]),
               x1[0] == c0, x2[0] == 0, x3[0] == g*c0, x4[0] == 0,
               x5[0] == 1/(c0*ka + ka*kc + c0*g*kc)}
```

```
Out[18]:= {x1'[t] == -a1*(x1[t] - x2[t]) - ka*vm*x1[t]*x5[t], x2'[t] == a2*(x1[t] - x2[t]),
           x3'[t] == -b1*(x3[t] - x4[t]) - kc*vm*x3[t]*x5[t], x4'[t] == b2*(x3[t] - x4[t]),
           x5'[t] == ka*x5[t]^2*(a1*(x1[t] - x2[t]) + ka*vm*x1[t]*x5[t]) +
           kc*x5[t]^2*(b1*(x3[t] - x4[t]) + kc*vm*x3[t]*x5[t]), x1[0] == c0,
           x2[0] == 0, x3[0] == c0*g, x4[0] == 0, x5[0] ==  $\frac{1}{c0*ka + c0*g*kc + ka*kc}$ }
```

```
In[19]:= output = {x1[t], x4[t]}
```

```
Out[19]:= {x1[t], x4[t]}
```

```
In[20]:= iad = IdentifiabilityAnalysis[{sys, output}, vars, params, t, {u1, u2}]
```

```
Out[20]:= IdentifiabilityAnalysisData[True, <>]
```

```
In[21]:= iad["IdentifiableQ"]
```

```
Out[21]:= True
```

```
In[22]:= iad["DegreesOfFreedom"]
```

```
Out[22]:= 0
```

```
In[23]:= iad["NonIdentifiableParameters"]
```

```
Out[23]:= {}
```

```
In[24]:= endTime = AbsoluteTime[]
        N[endTime - startTime]
```

```
Out[24]:= 3.6878020392079253 × 109
```

```
Out[25]:= 0.901136
```

```
In[26]:=
```