

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

```
Out[15]= 3.6891568006721086 × 109
```

```
In[16]:= vars = {x1, x2, x3, x4, x5, x6}
```

```
Out[16]= {x1, x2, x3, x4, x5, x6}
```

```
In[17]:= params = {k1, k2, k4, k5, k7, k9, k11, k3TrkA0,  
                  k6Ras0, k8Raf0, k10Mek0, sErk0, sK, n, NGF0, p1, p2}
```

```
Out[17]= {k1, k2, k4, k5, k7, k9, k11, k3TrkA0,  
          k6Ras0, k8Raf0, k10Mek0, sErk0, sK, n, NGF0, p1, p2}
```

```

In[18]:= sys = {x1'[t] == -x1[t] * k2 - NGF0 * k1 * (x1[t] - k3TrkA0),
  x2'[t] == -x2[t] * k5 - (x2[t] - k6Ras0) * (k4 + (x1[t] * p1) / (x6[t] + p1)),
  x3'[t] == x2[t] * (k8Raf0 - x3[t]) - k7 * x3[t],
  x4'[t] == x3[t] * (k10Mek0 - x4[t]) - k9 * x4[t],
  x5'[t] == -k11 * x5[t] - x4[t] * (x5[t] - sErk0),
  x6'[t] == (n * x6[t] / x5[t]) * (-k11 * x5[t] - x4[t] * (x5[t] - sErk0)),
  x1[0] == 0,
  x2[0] == (k4 * k6Ras0) / (k4 + k5),
  x3[0] == (k4 * k6Ras0 * k8Raf0) / ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5))),
  x4[0] == (k4 * k6Ras0 * k8Raf0 * k10Mek0) / ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5)) *
    (k9 + (k4 * k6Ras0 * k8Raf0) / ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5))))),
  x5[0] == (k4 * k6Ras0 * k8Raf0 * k10Mek0 * sErk0) /
    ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5)) * (k11 + (k4 * k6Ras0 * k8Raf0 * k10Mek0) /
      ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5)) * (k9 +
        (k4 * k6Ras0 * k8Raf0) / ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5)))))) *
      (k9 + (k4 * k6Ras0 * k8Raf0) / ((k4 + k5) * (k7 + (k4 * k6Ras0) / (k4 + k5))))),
  x6[
    0] ==
  p2}

Out[18]= {x1'[t] == -k2 x1[t] - k1 NGF0 (-k3TrkA0 + x1[t]),
  x2'[t] == -k5 x2[t] - (-k6Ras0 + x2[t]) (k4 + p1 x1[t] / (p1 + x6[t])),
  x3'[t] == x2[t] (k8Raf0 - x3[t]) - k7 x3[t], x4'[t] == x3[t] (k10Mek0 - x4[t]) - k9 x4[t],
  x5'[t] == -k11 x5[t] - x4[t] (-sErk0 + x5[t]),
  x6'[t] == (n (-k11 x5[t] - x4[t] (-sErk0 + x5[t])) x6[t]) / x5[t],
  x1[0] == 0, x2[0] == k4 k6Ras0 / (k4 + k5), x3[0] == k4 k6Ras0 k8Raf0 / ((k4 + k5) (k4 k6Ras0 / (k4 + k5) + k7)),
  x4[0] == k10Mek0 k4 k6Ras0 k8Raf0 / ((k4 + k5) (k4 k6Ras0 / (k4 + k5) + k7) (k4 k6Ras0 k8Raf0 / ((k4 + k5) (k4 k6Ras0 / (k4 + k5) + k7) + k9) + k9)),
  x5[0] == k10Mek0 k4 k6Ras0 k8Raf0 sErk0 / ((k4 + k5) (k4 k6Ras0 / (k4 + k5) + k7) (k4 k6Ras0 k8Raf0 / ((k4 + k5) (k4 k6Ras0 / (k4 + k5) + k7) + k9) + k9))
  , x6[0] == p2}

In[19]:= output = {x5[t]}

Out[19]= {x5[t]}

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

Out[20]= IdentifiabilityAnalysisData[False, <>]

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

Out[21]= False

```

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

```
Out[22]= 4
```

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

```
Out[23]= {k1, k2, k3TrkA0, NGF0, p1, p2, sK}
```

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

```
Out[24]=  $3.6891568030911393 \times 10^9$ 
```

```
Out[25]= 2.41903
```

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