

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

```
Out[2]:= 3.7143134082115011  $\times 10^9$ 
```

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

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

```
In[4]:= params = {d, d2tm0, d3, b, kTLtm0, e0dm0}
```

```
Out[4]:= {d, d2tm0, d3, b, kTLtm0, e0dm0}
```

```
In[5]:= sys = {x1'[t] == -d1 * x1[t] - d2m0 * x1[t] * x3[t],  
              x2'[t] == kTLtm0 * x1[t] - b * x2[t],  
              x3'[t] == d3 * e0dm0 - d3 * x3[t] - d2tm0 * x1[t] * x3[t],  
              x1[0] == 1, x2[0] == 0, x3[0] == e0dm0}
```

```
Out[5]:= {x1'[t] == -d1 x1[t] - d2m0 x1[t] x3[t], x2'[t] == kTLtm0 x1[t] - b x2[t],  
          x3'[t] == d3 e0dm0 - d3 x3[t] - d2tm0 x1[t] x3[t], x1[0] == 1, x2[0] == 0, x3[0] == e0dm0}
```

```
In[6]:= output = {x2[t]}
```

```
Out[6]:= {x2[t]}
```

```
In[7]:= iad = IdentifiabilityAnalysis[{sys, output}, vars, params, t]
```

```
MatrixRank::nmod :
```

```
{{0,0,0,0,2147483628 d1,0,0,1,0},{0,0,0,0,1 + 441510061 d1,0,2021483916 + 125999713 d1,1705973568,125999713 d2m0}
} is not valid modulo 2147483629.>>
```

```
MatrixRank::nmod : <<1>> is not valid modulo 2147483629.>>
```

```
MatrixRank::nmod :
```

```
{{0,0,0,0,2147483627 d1,0,0,1,0},<<6>>,{0,<<7>>,2086513770 d2m0 + 177833867 d1 d2m0 + 958205955 d12 d2m0 +
825027329 d13 d2m0 + 2065771611 d14 d2m0 + 753532917 d15 d2m0 + 906167840 d16 d2m0 + 36087405 d2m02 +
2141434200 d1 d2m02 + <<10>> + 253383446 d1 d2m04 + 190947060 d12 d2m04 + 56057245 d13 d2m04 +
343984856 d2m05 + 940352233 d1 d2m05 + 1575751637 d12 d2m05 + 1839182757 d2m06 + 345370266 d1 d2m06 +
151650050 d2m07}} is not valid modulo 2147483629.>>
```

```
General::stop : Further output of MatrixRank::nmod will be suppressed during this calculation.>>
```

```
RowReduce::nmod : {{0,0,0,0,2147483627 d1,0,0,1,0},<<8>>} is not valid modulo 2147483629.>>
```

```
Transpose::nmtx : The first two levels of the one-dimensional list
```

```
{NullSpace[RowReduce[{{0,0,0,0,2147483627 d1,0,0,1,0},{0,<<8>>},<<5>>,{0,<<7>>,<<1>>},{0,<<7>>,1287297962
d2m0 + 801289929 d1 d2m0 + 1966717609 Power[<<2>>] d2m0 + 627822680 Power[<<2>>] d2m0 +
1066637382 Power[<<2>>] d2m0 + 653590196 Power[<<2>>] d2m0 + <<24>> + 1916936665 Power[<<2>>] +
701360135 d1 Power[<<2>>] + 1884760917 Power[<<2>>] Power[<<2>>] + 1445383961 Power[<<2>>] +
1436460448 d1 Power[<<2>>] + 1571862631 Power[<<2>>]]},<<1>>,<<1>>]]
cannot be transposed.>>
```

```
Part::take : Cannot take positions 1 through 6 in
```

```
NullSpace[{{0,0,0,0,0,1,0,0},{0,0,0,0,0,0,1,0},{0,0,0,0,0,-1,0,0,1}}.Transpose[{{NullSpace[RowReduce[{{<<9>>},
Rule[<<2>>]],Modulus -> 2147483629]]},Modulus -> 2147483629].NullSpace[RowReduce[{{0,0,0,0,
2147483627 d1,0,0,1,0},<<7>>,{0,<<1>>,<<5>>,35612030,1287297962 d2m0 + 801289929 d1 d2m0 +
1966717609 Power[<<2>>] d2m0 + <<30>> + 1445383961 Power[<<2>>] + 1436460448 d1 Power[<<2>>] +
1571862631 Power[<<2>>]]},<<1>>,<<1>>].>>
```

```
Out[7]= IdentifiabilityAnalysisData[False,<>]
```

```
In[8]:= iad["IdentifiableQ"]
```

```
Out[8]= False
```

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

```
Out[9]= 2
```

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

```
Out[10]= {b, d, d2tm0, d3, e0dm0, kTLtm0}
```

```
In[11]:= endTime = AbsoluteTime[]
```

```
N[endTime - startTime]
```

```
Out[11]= 3.7143134168499305 × 109
```

```
Out[12]= 8.63843
```

```
In[13]=
```