Sampling parameter for 7 steady states

The polynomial

$$\text{term} = -T_1 + \frac{(k_2 + k_{19})\, T_2 + (k_{14} + k_{19})\, T_4}{k_{19}} + x_1 + \frac{k_2\, T_2\, (-k_5\, (k_4 + k_6)\, (k_2 + k_{19}) - k_3\, (-k_4\, k_5 + k_2\, (k_5 + k_6) + k_6\, k_{19})\, x_1)}{k_{19}\, (k_3\, k_6\, x_1\, (k_5 + k_1\, x_1) + k_2\, (k_5\, (k_4 + k_6) + k_3\, (k_5 + k_6)\, x_1))} + \frac{k_9\, T_3\, x_1\, (k_{11}\, (k_{12}\, k_{19} + k_8\, (k_{10} + k_{12} + k_{19})) + k_7\, k_{12}\, (k_8 + k_{19})\, x_1)}{k_{19}\, (k_9\, k_{12}\, x_1\, (k_{11} + k_7\, x_1) + k_8\, (k_{11}\, (k_{10} + k_{12}) + k_9\, (k_{11} + k_{12})\, x_1))} + \frac{k_{14}\, T_4\, (-k_{17}\, (k_{16} + k_{18})\, (k_{14} + k_{19}) - k_{15}\, (-k_{16}\, k_{17} + k_{14}\, (k_{17} + k_{18}) + k_{18}\, k_{19})\, x_1)}{k_{19}\, (k_{15}\, k_{18}\, x_1\, (k_{17} + k_{13}\, x_1) + k_{14}\, (k_{17}\, (k_{16} + k_{18}) + k_{15}\, (k_{17} + k_{18})\, x_1))};$$

```
pol = Collect[Numerator[Together[term]], x1];
```

Sampling

```
SeedRandom[];
ss7ParSets = {};
ss7PolSets = {};
ss7SolSets = {};
minPar = Log[0.000001]; maxPar = Log[1 000 000.];
minTot = Log[0.0001]; maxTot = Log[10 000.];
Timing[
 Do[{
    (*pars=Exp[-RandomVariate[
          ExponentialDistribution[Log[2]/(-Log[0.001])],13]]*1000;
    tots=Exp[-RandomVariate[ExponentialDistribution[Log[2]/(-Log[0.001])],3]]*
      1000;*)
    pars = Exp[RandomReal[{minPar, maxPar}, 19]];
    tots = Exp[RandomReal[{minTot, maxTot}, 4]];
    subs = {k1 → pars[[1]], k2 → pars[[2]], k3 → pars[[3]],
      k4 → pars[[4]], k5 → pars[[5]], k6 → pars[[6]], k7 → pars[[7]],
      k8 → pars[[8]], k9 → pars[[9]], k10 → pars[[10]], k11 → pars[[11]],
      k12 → pars[[12]], k13 → pars[[13]], k14 → pars[[14]], k15 → pars[[15]],
      k16 → pars[[16]], k17 → pars[[17]], k18 → pars[[18]], k19 → pars[[19]],
      T1 → tots[[1]], T2 → tots[[2]], T3 → tots[[3]], T4 → tots[[4]]};
    solution = Select[DeleteDuplicates[Re[x1 /. NSolve[{pol == 0} /. subs, x1]]],
      Positive];
    If[Length[Flatten[solution]] == 7, {
      AppendTo[ss7ParSets, Flatten[Join[pars, tots]]];
      AppendTo[ss7PolSets, pol /. subs];
      AppendTo[ss7SolSets, Flatten[solution]];}
    ];
   }, {i, 5 000 000}];
]

Length[ss7ParSets]
```

```
0
```