```
config = {
  tempLimits = {lower=300.000000, upper=50000.000000},
  odeStep = {method='alpha-qss', eps1= 1.000000e-03, eps2= 5.000000e-04, delta=
1.000000e-10, maxIters=10},
  tightTempCoupling = true,
  maxSubcycles = 10000,
  maxAttempts = 4
}

reaction = {}
reaction[1] = {
  equation = "H2 + M <=> H + H + M",
  type = "anonymous_collider",
  frc      =      {model='Arrhenius',      A=5.500000000000e+12,      n=-1.000000,
C=5.198700000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.800000000000e+06,      n=-1.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 3,},
  reacCoeffs = { 1.000000e+00,},
  prodIdx = { 2,},
  prodCoeffs = { 2.000000e+00,},
  efficiencies = {
    [0]=1.000000e+00,
    [1]=1.000000e+00,
    [2]=1.000000e+00,
    [3]=1.000000e+00,
    [4]=1.000000e+00,
    [5]=1.000000e+00,
    [6]=1.000000e+00,
    [7]=1.000000e+00,
  },
}

reaction[2] = {
  equation = "O2 + M <=> O + O + M",
  type = "anonymous_collider",
  frc      =      {model='Arrhenius',      A=7.200000000000e+12,      n=-1.000000,
C=5.934000000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=4.000000000000e+05,      n=-1.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 1,},
  reacCoeffs = { 1.000000e+00,},
```

```
  prodIdx = { 0,},
  prodCoeffs = { 2.000000e+00,},
  efficiencies = {
    [0]=1.000000e+00,
    [1]=1.000000e+00,
    [2]=1.000000e+00,
    [3]=1.000000e+00,
    [4]=1.000000e+00,
    [5]=1.000000e+00,
    [6]=1.000000e+00,
    [7]=1.000000e+00,
  },
}

reaction[3] = {
  equation = "H2O + M <=> OH + H + M",
  type = "anonymous_collider",
  frc      =      {model='Arrhenius',      A=5.200000000000e+15,      n=-1.500000,
C=5.938600000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=4.400000000000e+08,      n=-1.500000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 4,},
  reacCoeffs = { 1.000000e+00,},
  prodIdx = { 2, 5,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
  efficiencies = {
    [0]=1.000000e+00,
    [1]=1.000000e+00,
    [2]=1.000000e+00,
    [3]=1.000000e+00,
    [4]=1.000000e+00,
    [5]=1.000000e+00,
    [6]=1.000000e+00,
    [7]=1.000000e+00,
  },
}

reaction[4] = {
  equation = "OH + M <=> O + H + M",
  type = "anonymous_collider",
  frc      =      {model='Arrhenius',      A=8.500000000000e+12,      n=-1.000000,
C=5.083000000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=7.100000000000e+06,      n=-1.000000,
```

```
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 5,},
  reacCoeffs = { 1.000000e+00,},
  prodIdx = { 0, 2,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
  efficiencies = {
    [0]=1.000000e+00,
    [1]=1.000000e+00,
    [2]=1.000000e+00,
    [3]=1.000000e+00,
    [4]=1.000000e+00,
    [5]=1.000000e+00,
    [6]=1.000000e+00,
    [7]=1.000000e+00,
  },
}

reaction[5] = {
  equation = "HO2 + M <=> H + O2 + M",
  type = "anonymous_collider",
  frc = {model='Arrhenius', A=1.700000000000e+10, n=0.000000,
C=2.310000000000e+04, rctIndex=-1},
  brc = {model='Arrhenius', A=1.100000000000e+04, n=0.000000, C=-
4.400000000000e+02, rctIndex=-1},
  ec = {},
  reacIdx = { 6,},
  reacCoeffs = { 1.000000e+00,},
  prodIdx = { 1, 2,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
  efficiencies = {
    [0]=1.000000e+00,
    [1]=1.000000e+00,
    [2]=1.000000e+00,
    [3]=1.000000e+00,
    [4]=1.000000e+00,
    [5]=1.000000e+00,
    [6]=1.000000e+00,
    [7]=1.000000e+00,
  },
}

reaction[6] = {
  equation = "H2O + O <=> OH + OH",
```

```
  type = "elementary",
  frc      =      {model='Arrhenius',      A=5.800000000000e+07,      n=0.000000,
C=9.059000000000e+03, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=5.300000000000e+06,      n=0.000000,
C=5.030000000000e+02, rctIndex=-1},
  ec = {},
  reacIdx = { 0, 4,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 5,},
  prodCoeffs = { 2.000000e+00,},
}

reaction[7] = {
  equation = "H2O + H <=> OH + H2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=8.400000000000e+07,      n=0.000000,
C=1.011600000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=2.000000000000e+07,      n=0.000000,
C=2.600000000000e+03, rctIndex=-1},
  ec = {},
  reacIdx = { 2, 4,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 3, 5,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[8] = {
  equation = "O2 + H <=> OH + O",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=2.200000000000e+08,      n=0.000000,
C=8.455000000000e+03, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.500000000000e+07,      n=0.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 1, 2,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 0, 5,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[9] = {
  equation = "H2 + O <=> OH + H",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=7.500000000000e+07,      n=0.000000,
```

```
C=5.586000000000e+03, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=3.000000000000e+07,      n=0.000000,
C=4.429000000000e+03, rctIndex=-1},
  ec = {},
  reacIdx = { 0, 3,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 2, 5,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[10] = {
  equation = "H2 + O2 <=> OH + OH",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=1.700000000000e+07,      n=0.000000,
C=2.423200000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=5.700000000000e+05,      n=0.000000,
C=1.492200000000e+04, rctIndex=-1},
  ec = {},
  reacIdx = { 1, 3,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 5,},
  prodCoeffs = { 2.000000e+00,},
}

reaction[11] = {
  equation = "H2 + O2 <=> H + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=1.900000000000e+07,      n=0.000000,
C=2.410000000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.300000000000e+07,      n=0.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 1, 3,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 2, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[12] = {
  equation = "OH + OH <=> H + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=1.700000000000e+05,      n=0.500000,
C=2.113700000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=6.000000000000e+07,      n=0.000000,
```

```
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 5,},
  reacCoeffs = { 2.000000e+00,},
  prodIdx = { 2, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[13] = {
  equation = "H2O + O <=> H + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=5.800000000000e+05,      n=0.500000,
C=2.868600000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=3.000000000000e+07,      n=0.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 0, 4,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 2, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[14] = {
  equation = "OH + O2 <=> O + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=3.700000000000e+05,      n=0.640000,
C=2.784000000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.000000000000e+07,      n=0.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
  reacIdx = { 1, 5,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 0, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[15] = {
  equation = "H2O + O2 <=> OH + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=2.000000000000e+05,      n=0.500000,
C=3.629600000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.200000000000e+07,      n=0.000000,
C=0.000000000000e+00, rctIndex=-1},
  ec = {},
```

```
  reacIdx = { 1, 4,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 5, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}

reaction[16] = {
  equation = "H2O + OH <=> H2 + HO2",
  type = "elementary",
  frc      =      {model='Arrhenius',      A=1.200000000000e+06,      n=0.210000,
C=3.981500000000e+04, rctIndex=-1},
  brc      =      {model='Arrhenius',      A=1.700000000000e+07,      n=0.000000,
C=1.258200000000e+04, rctIndex=-1},
  ec = {},
  reacIdx = { 4, 5,},
  reacCoeffs = { 1.000000e+00, 1.000000e+00,},
  prodIdx = { 3, 6,},
  prodCoeffs = { 1.000000e+00, 1.000000e+00,},
}
```