

Additional File 1 — Pseudo-code for the genetic algorithm with the deterministic precondition

Data: High-throughput PDFs. Biochemical Model.

Define: Number of Free Parameters (θ_{fp}). Ranges for Parameter Values. Number of Generations (G). Population Size (PS). Mutation Rate (μ). Rate of Elitism (ϵ).

Result: Parameter values that best reproduce the experimental data.

GENERATE a initial population of random parameters.

```
for  $i = 1 : G$  do
   $j = 1$  ;
  while  $j < PS$  do
    Assign the  $j^{th}$  parameter set in the model;
    Run deterministic dynamics ;
    Test deterministic precondition ;
    if deterministic precondition is true then
      RUN stochastic simulations ;
      Objective Function ( $OF$ ) evaluation ;
       $fitness = 1/OF$ 
    else
      Reject the  $j^{th}$  parameter set ;
      Set  $OF = \infty$  ;
       $fitness = 0$ ;
    end
     $j = j + 1$ 
  end

  RANK individuals according to its  $fitness$  ;
  SELECT a number of parental individuals ( $PI$ ),  $np = PS \times \epsilon$  ;
  RECOMBINE  $PI$  until generate a offspring number,  $no = PS - PI$  ;
  MUTATE each offspring with a number of mutations,  $nm = \theta_{fp} \times \mu$ ;
end
```

Algorithm A1: Genetic algorithm with a deterministic precondition