1. Simulation and optimization is run in the new “pharsol” and “PMcore” packages that Julian wrote in Rust
2. One compartment model with fixed volume. Each subject has parameters:
   1. Ke is mean-reverting stochastic with,
      1. mean, Ke\_0 ~ N(1.2, 0.12)
      2. sd, sigma\_Ke ~ N(0.1, 0.01)
   2. Volume is fixed
   3. Subjects are in “subjects.csv”
3. 200 unit bolus is applied at time = 0, concentration is measured at 0.2, 0.4, 0.6,0.8,and 1.0, i.e. DT = 0.2
4. Euler-Maruyama is used to update SDE, w/dt=DT/10
   1. output used for optimization is in “test.csv”
   2. there are 100 subjects.
5. NPAG (but using SDE and particle filter)
   1. Implementation details of particle filter are \_\_\_\_ (ask Julian)
   2. SDE uses Euler-Maruyama
      1. Nparticles = 11
   3. Prior = Sobol sequence w/1000 points, seed = 347
   4. AB =

ke0 = [0.0001, 2.4]

ske = [0.0001, 0.2]

* 1. Error is additive w/initial L=1.0 and a polynomial coefficients = [-0.00119, 0.44379, -0.45864, 0.16537]

1. Optimized density is in “theta.csv”
2. Cycle statistics, including the final cycle are in “cycle.csv”
   1. Convergence at cycle 47
   2. Likelihood = 758.6762371426402
   3. L = 0.00000019415113952421819
   4. Number of supports at convergence = 8
   5. Ke (mean, median sigma) =
      1. 1.1868038440299031, 1.1815306262564658, 0.022330679917247367
   6. Sigma Ke (mean, median sigma) =
      1. 0.11757628953933719,0.11475543504714969,0.048380266764816396
   7. Note: Stochastic process, so every time the program is run, you get a different result, but for most runs, estimation of Ke and sigma\_KE is “OK”, see file “sample\_out.csv”
      1. > summary(outs$Ke\_mean)

Min. 1st Qu. Median **Mean** 3rd Qu. Max.

1.159 1.184 1.188 **1.189** 1.193 1.226

* + 1. > summary(outs$ske\_mean)

Min. 1st Qu. Median **Mean** 3rd Qu. Max.

0.01380 0.07465 0.09548 **0.09145** 0.10976 0.12474

h. The standard deviation of sigma Ke is correct, but the sigma of Ke is way too small (mean sigma sigma Ke = 0.009131 vs. 0.01 truth; mean sigma Ke = 0.02971 vs. 0.12 truth)