*Ground Truth Recovery-procedure

1. Start with ground truth parameters (G, λ, δ)[6]
2. Run simulation to predict behavior using these parameters
3. Extract key statistics describing the simulation: $(\beta, R^2, \%1)$
4. Find best match in variation.csv: Use 1-Nearest Neighbor to find simulation with most similar $(\beta, R^2, \%1)$ among a large set of catalogued simulations
5. The (G, λ, δ) of this best-matching simulation are the recovered ground truth
6. Calculate the euclidiean distance between the ground truth parameters and the best-matching ones.

Parameter range:

- G: [0.25 , 0.262, 0.275, 0.288, 0.3]
- λ: [0.068, 0.097, 0.126, 0.155, 0.184, 0.213, 0.242, 0.271, 0.3]
- δ: [0.1 , 0.125, 0.15 , 0.175, 0.2 , 0.225, 0.25 , 0.275, 0.3]

[6]Note that here we are fixing GD, κ, α across aggregated simulations

*Ground Truth Recovery-metric

- In Step 6, the euclidean distance between the ground truth parameters and the best-matching ones is calculated as the following:

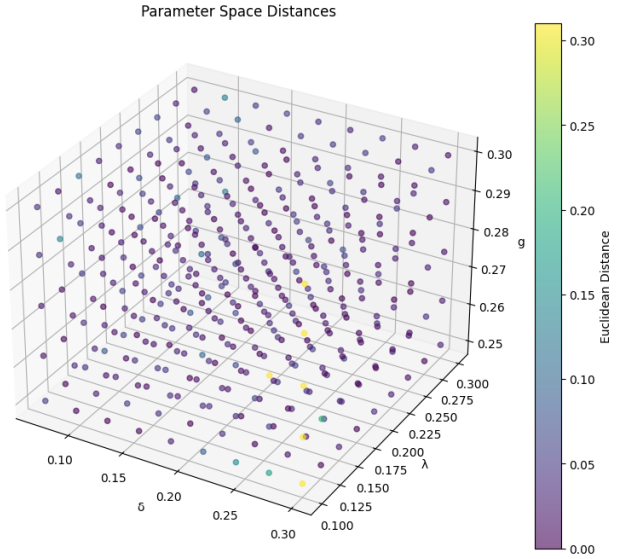
$$\text{Distance} = \sqrt{|g_{gt} - g_{fit}|^2 + |\lambda_{gt} - \lambda_{fit}|^2 + |\delta_{gt} - \delta_{fit}|^2}$$

- By construction, the maximum distance we can get is around 0.3104 and the minimum is 0 (=perfect fit).
- The following are more examples:
  - Distance $\simeq 0.012$:
    $(g_{gt}, g_{fit}, \lambda_{gt}, \lambda_{fit}, \delta_{gt}, \delta_{fit}) = (0.25, 0.262, 0.125, 0.125, 0.126, 0.126)$
  - Distance $\simeq 0.05$:
    $(g_{gt}, g_{fit}, \lambda_{gt}, \lambda_{fit}, \delta_{gt}, \delta_{fit}) = (0.262, 0.3, 0.068, 0.25, 0.25, 0.068)$
  - Distance $\simeq 0.075$:
    $(g_{gt}, g_{fit}, \lambda_{gt}, \lambda_{fit}, \delta_{gt}, \delta_{fit}) = (0.288, 0.15, 0.271, 0.25, 0.125, 0.213)$
  - Distance $\simeq 0.1$:
    $(g_{gt}, g_{fit}, \lambda_{gt}, \lambda_{fit}, \delta_{gt}, \delta_{fit}) = (0.25, 0.15, 0.068, 0.25, 0.25, 0.097)$

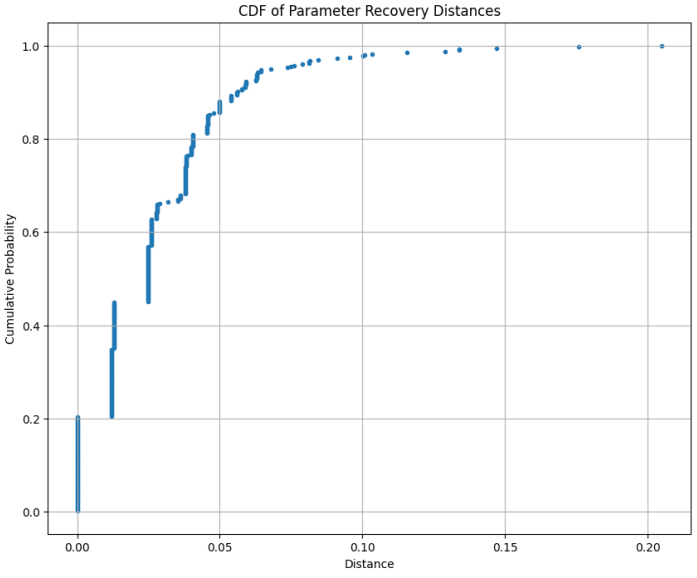
*Ground Truth Recovery-empirical fit

data	$(g_{gt}, \lambda_{gt}, \delta_{gt})$	$(g_{fit}, \lambda_{fit}, \delta_{fit})$	distance
gym	(0.25,0.275,0.126)	(0.262,0.300,0.126)	0.028
Moment	(0.25,0.175,0.126)	(0.262,0.175,0.126)	0.012
Zearn	(0.35,0.200,0.155)	(0.300,0.175,0.155)	0.055
Weibo	(0.25,0.175,0.155)	(0.250,0.175,0.155)	0.000

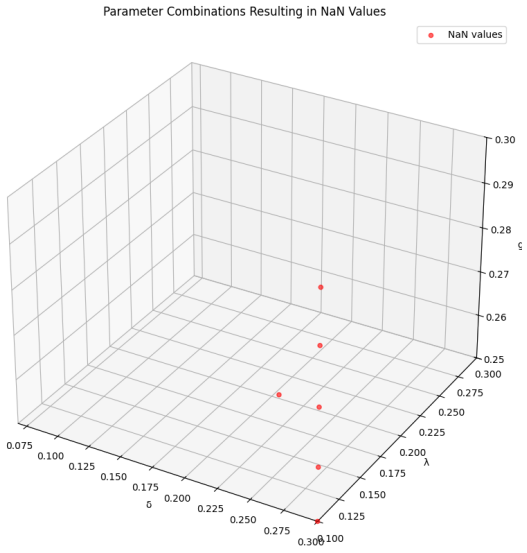
*Ground Truth Recovery-results



*Ground Truth Recovery-CDF



*Ground Truth Recovery-NaN values



*Ground Truth Recovery-Sensitivity Analysis