

1 E. coli Glucose data with $\alpha = 0$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

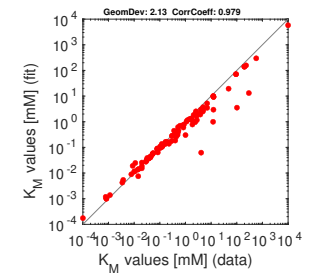
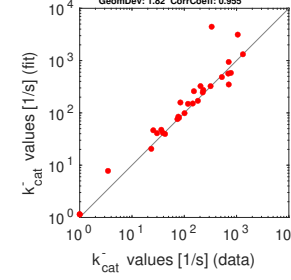
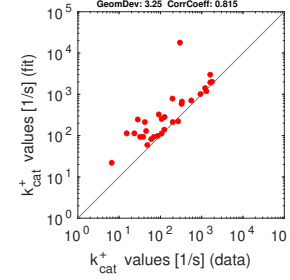
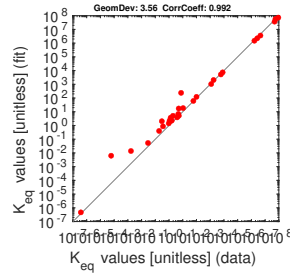
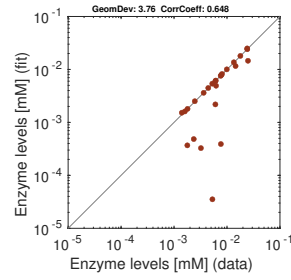
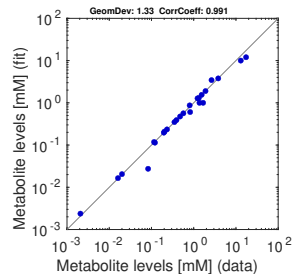
(c) K_{eq} values

(d) k_{cat}^+ values

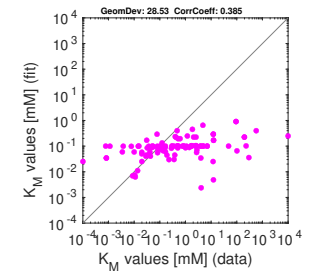
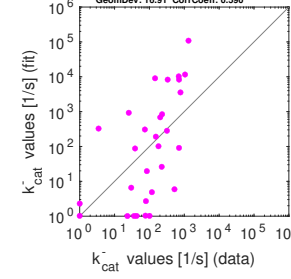
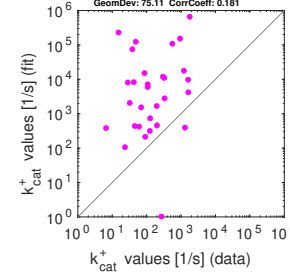
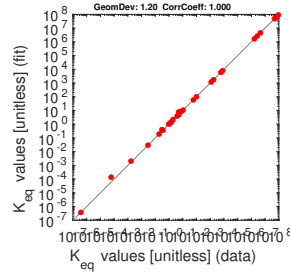
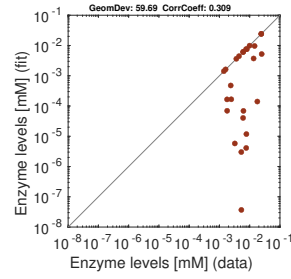
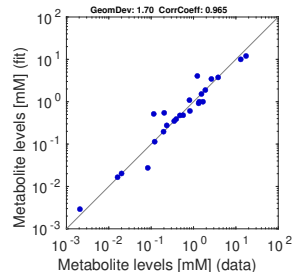
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

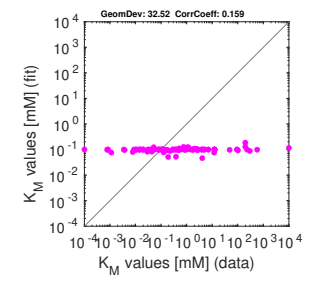
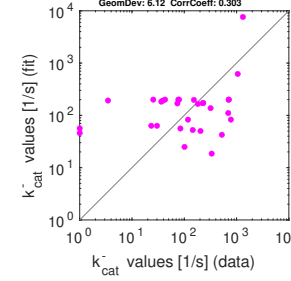
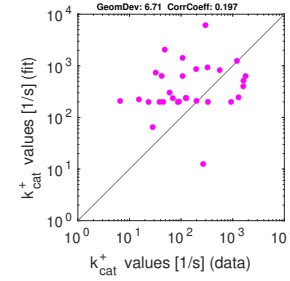
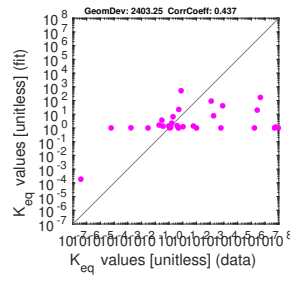
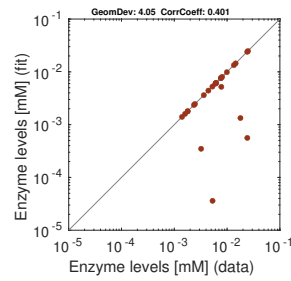
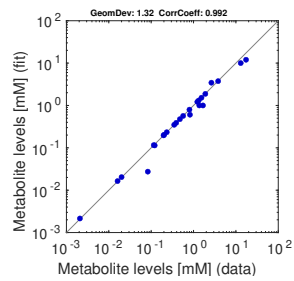


Figure 3: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

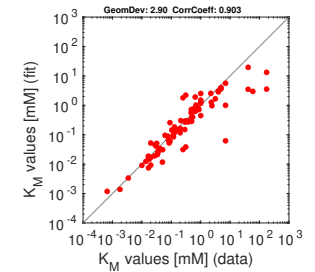
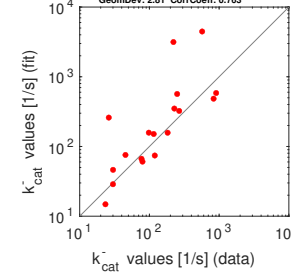
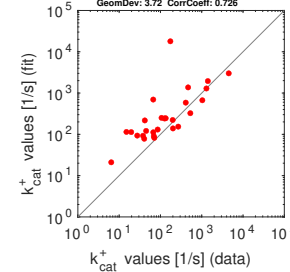
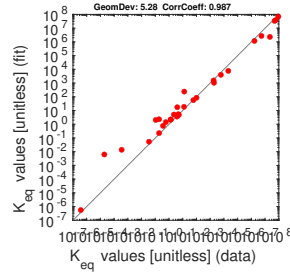
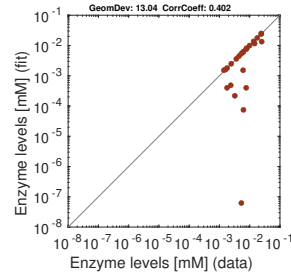
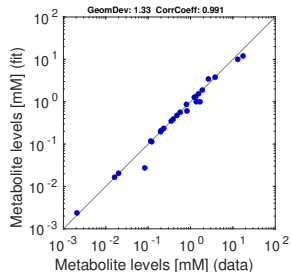
(c) K_{eq} values

(d) k_{cat}^+ values

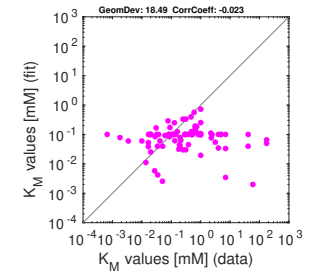
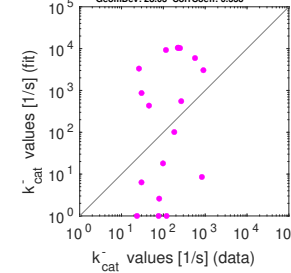
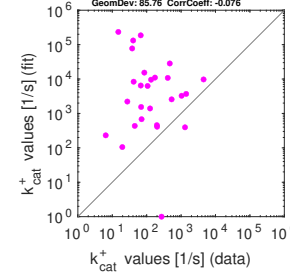
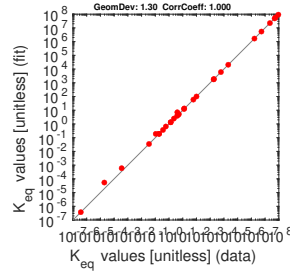
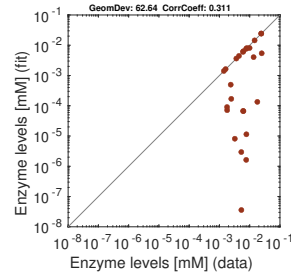
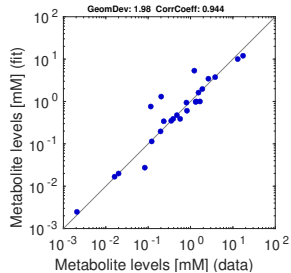
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

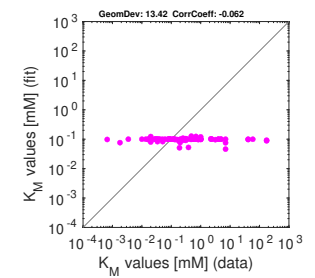
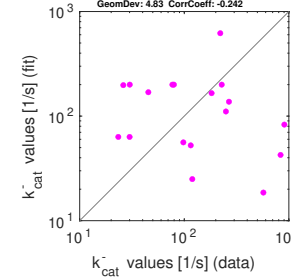
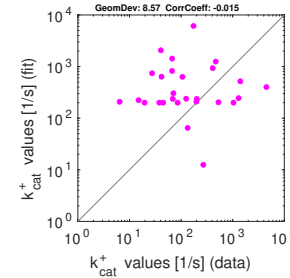
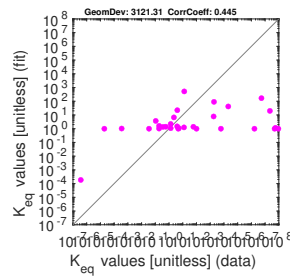
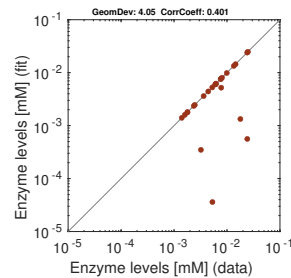
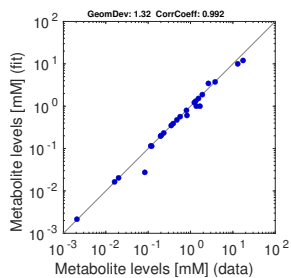


Figure 4: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

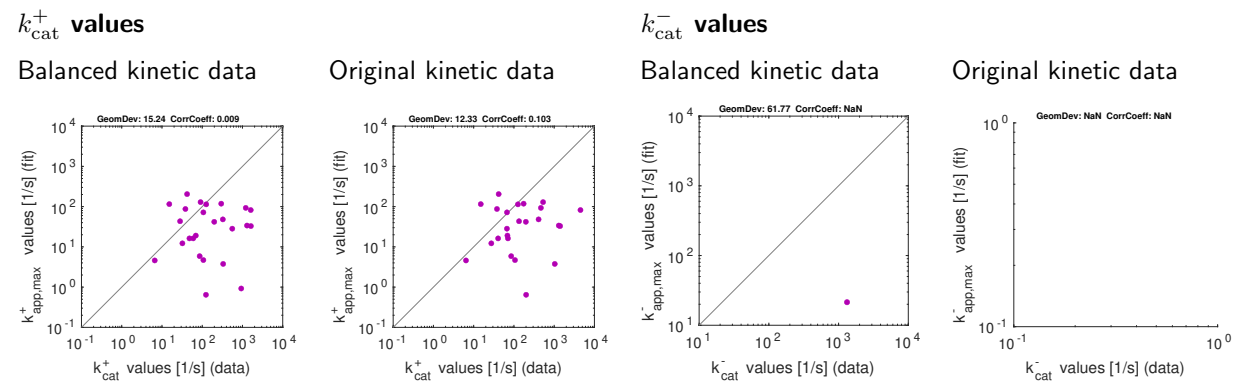


Figure 5: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].

2 E. coli Glucose data with $\alpha = 0.001$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

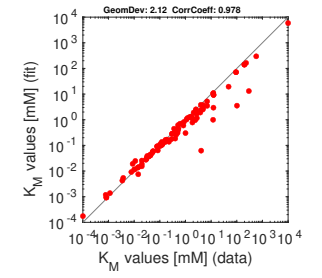
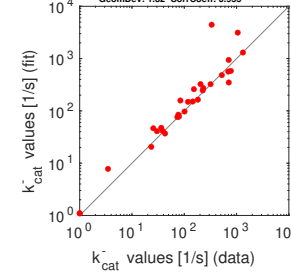
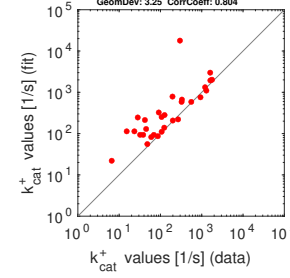
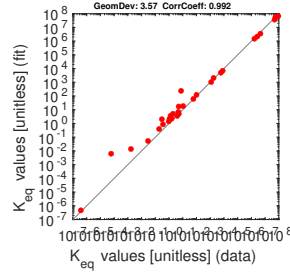
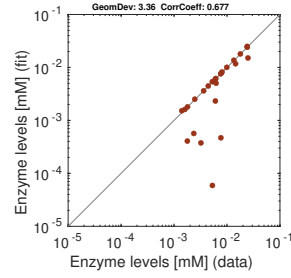
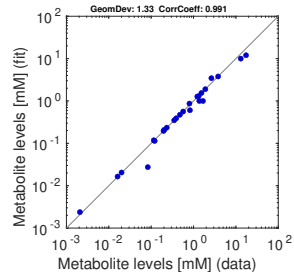
(c) K_{eq} values

(d) k_{cat}^+ values

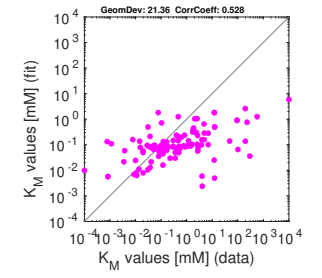
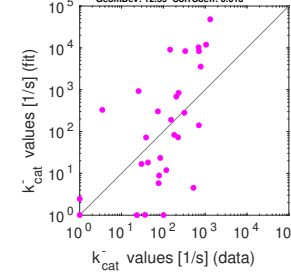
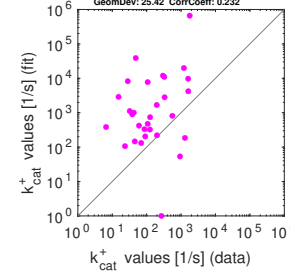
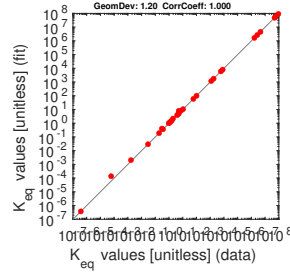
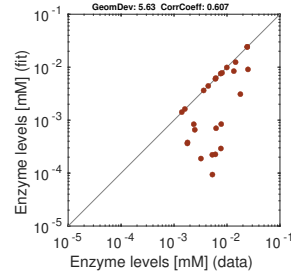
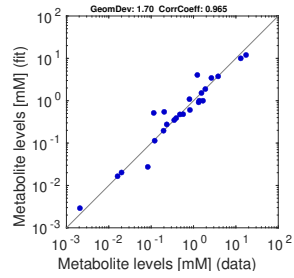
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

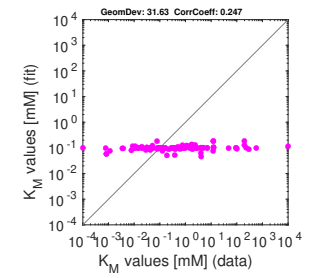
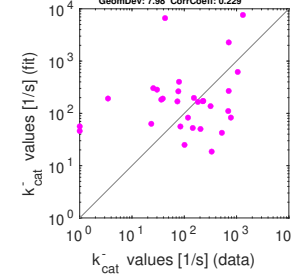
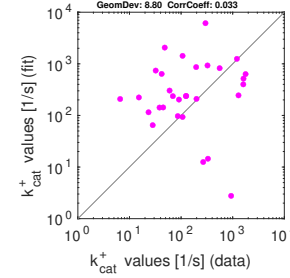
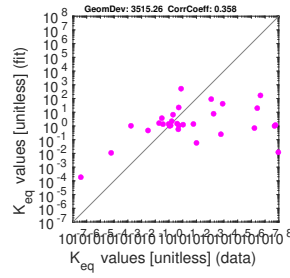
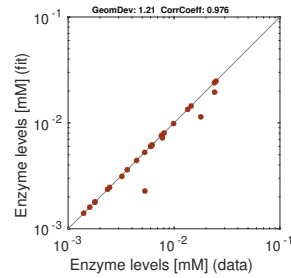
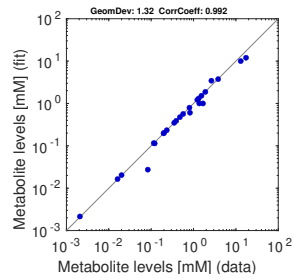


Figure 6: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

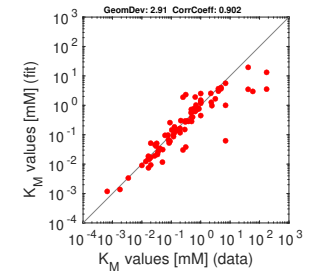
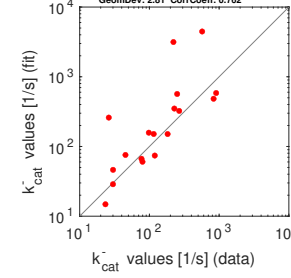
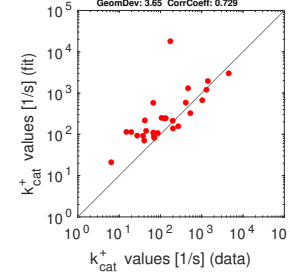
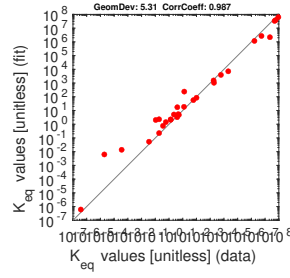
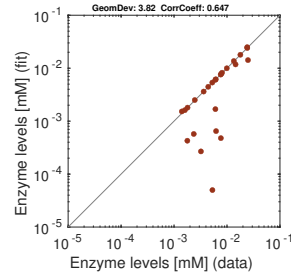
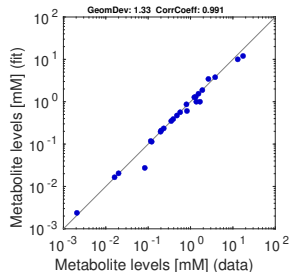
(c) K_{eq} values

(d) k_{cat}^+ values

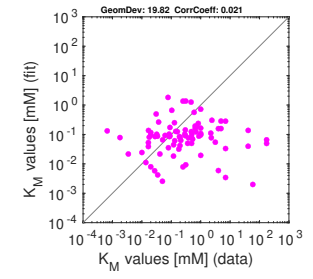
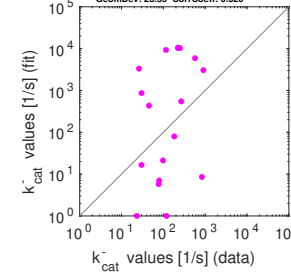
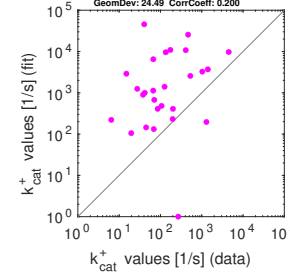
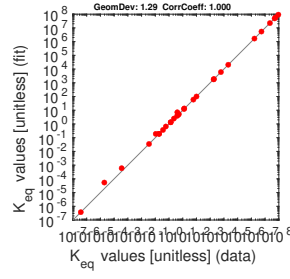
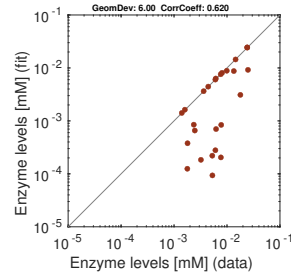
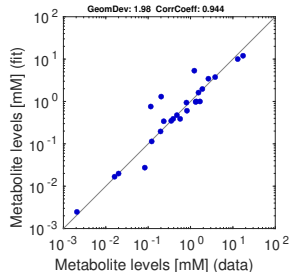
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

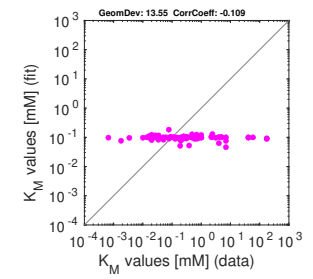
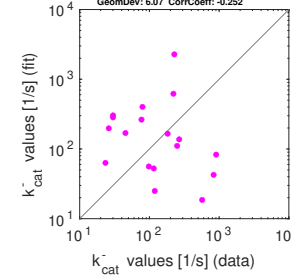
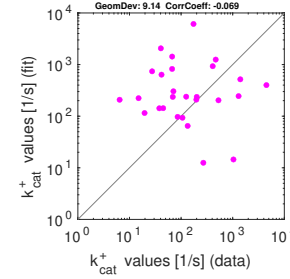
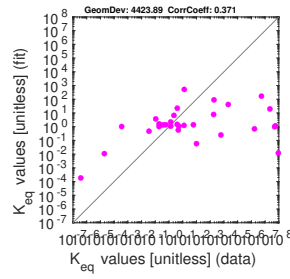
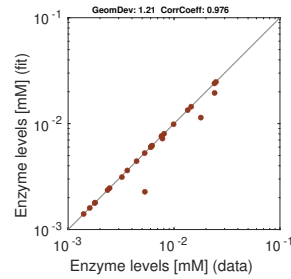
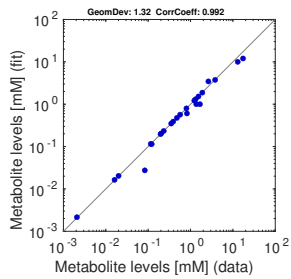


Figure 7: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

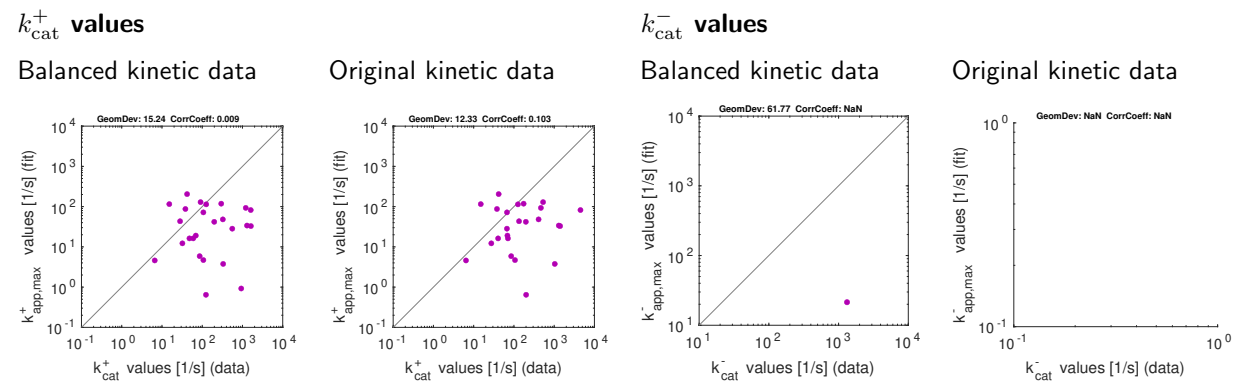


Figure 8: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].

3 E. coli Glucose data with $\alpha = 0.01$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

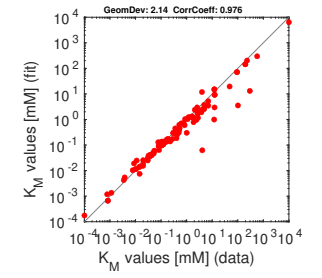
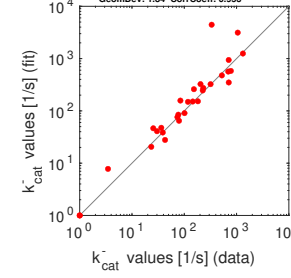
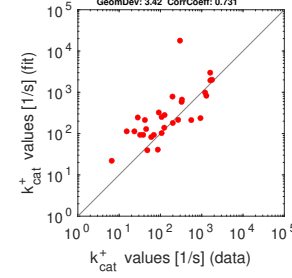
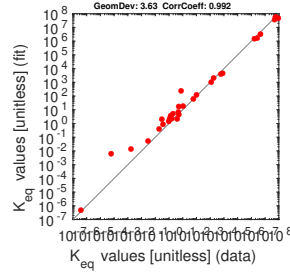
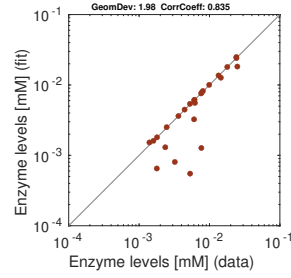
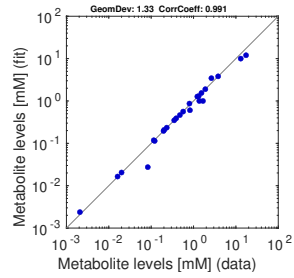
(c) K_{eq} values

(d) k_{cat}^+ values

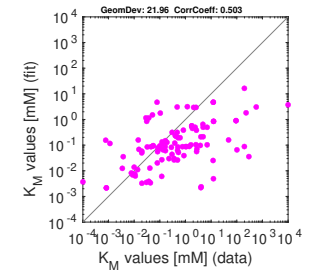
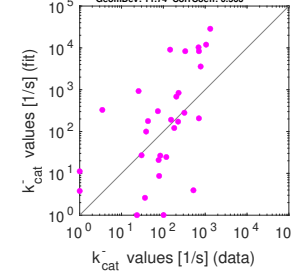
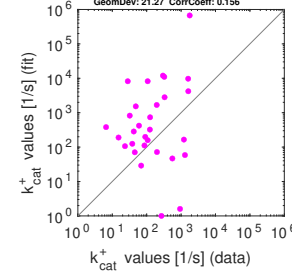
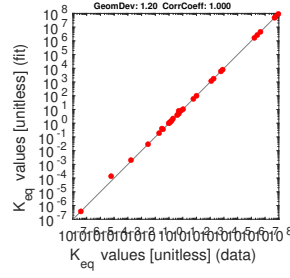
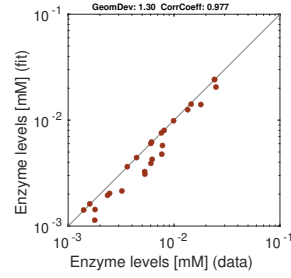
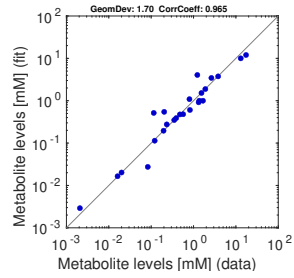
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

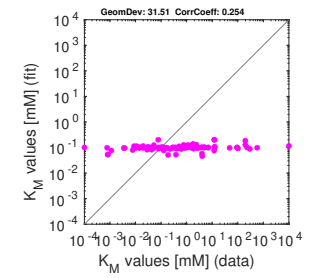
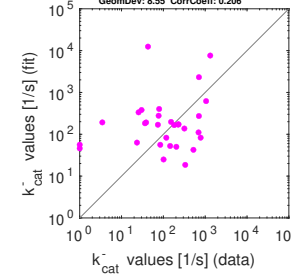
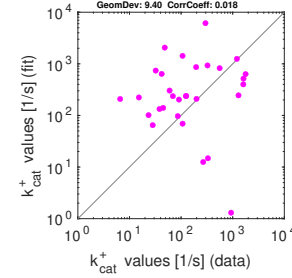
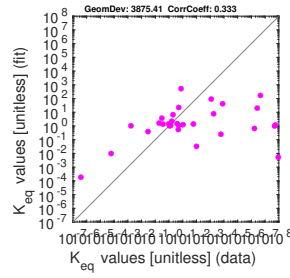
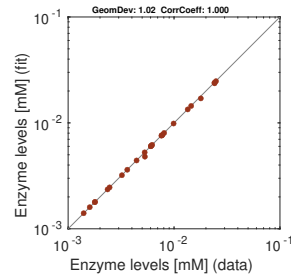
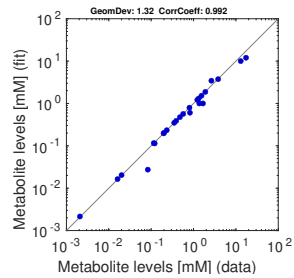


Figure 9: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

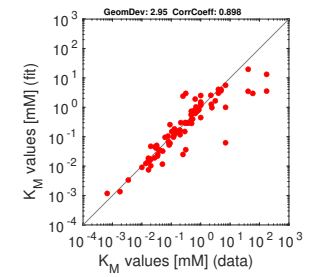
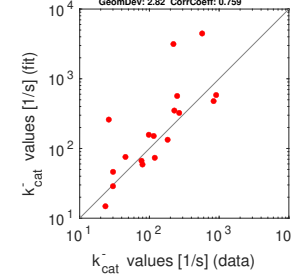
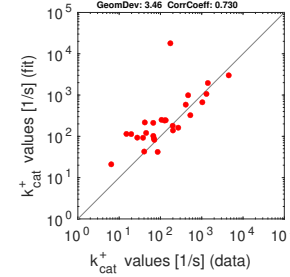
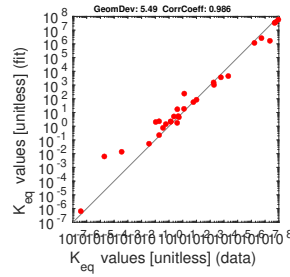
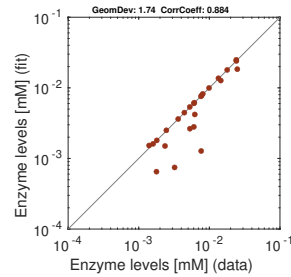
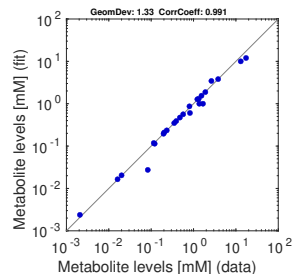
(c) K_{eq} values

(d) k_{cat}^+ values

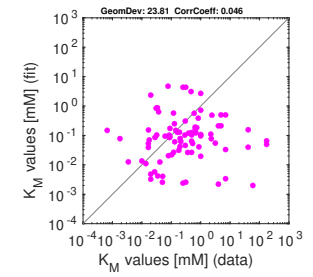
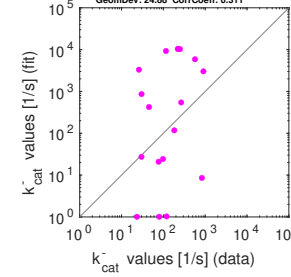
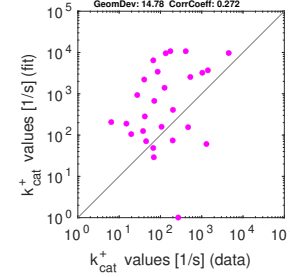
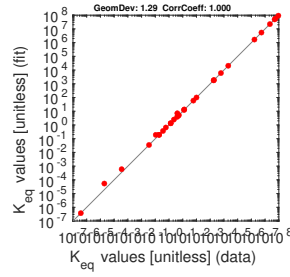
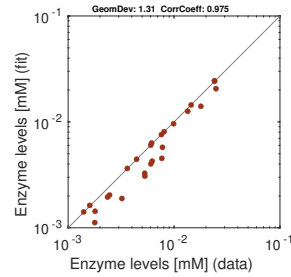
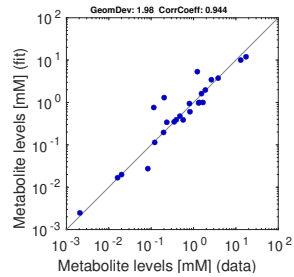
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

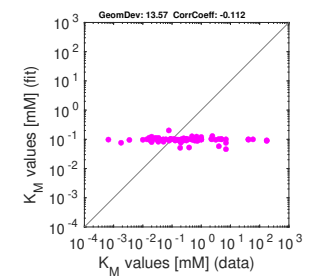
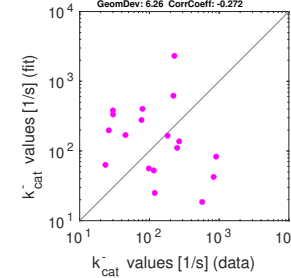
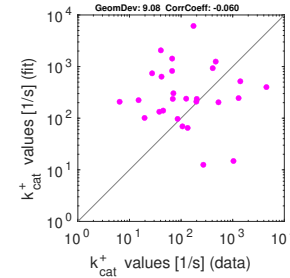
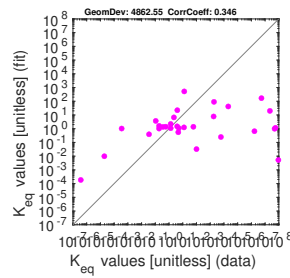
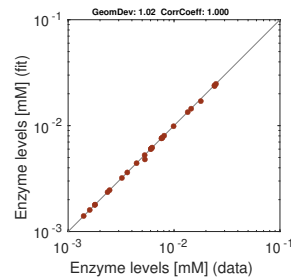
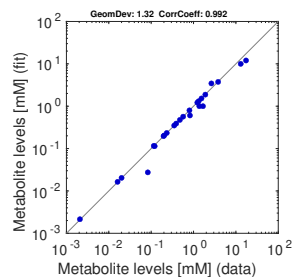


Figure 10: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

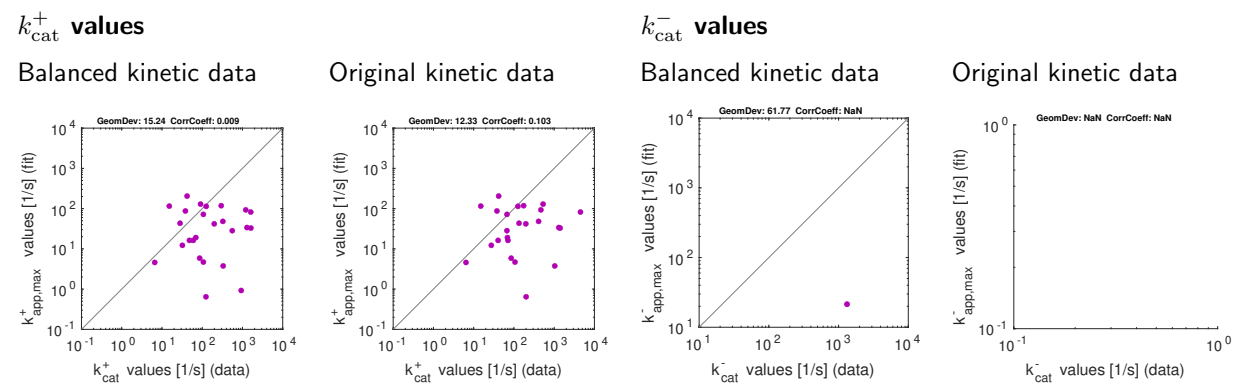


Figure 11: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].

4 E. coli Glucose data with $\alpha = 0.1$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

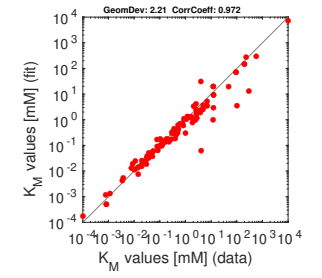
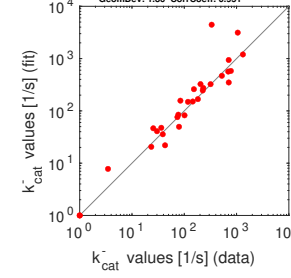
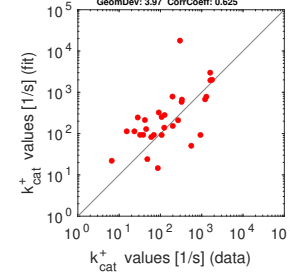
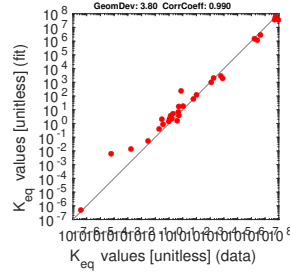
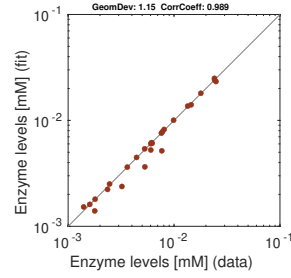
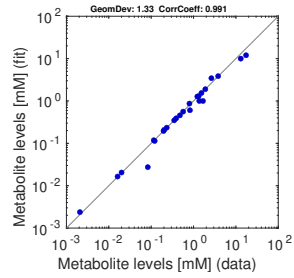
(c) K_{eq} values

(d) k_{cat}^+ values

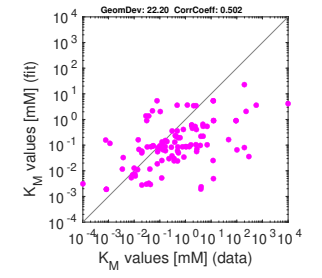
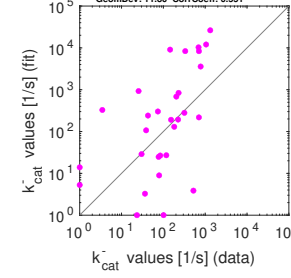
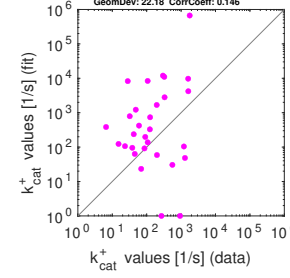
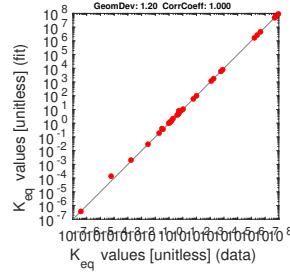
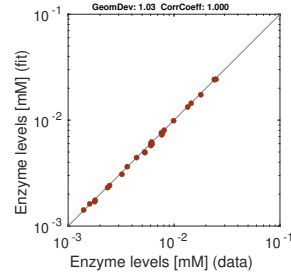
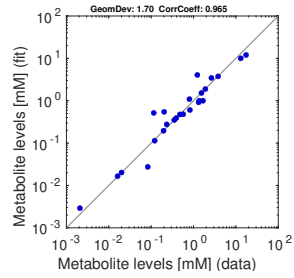
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

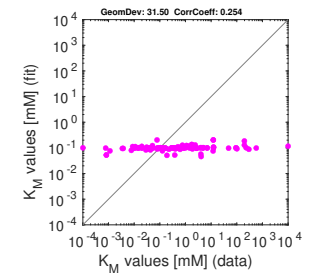
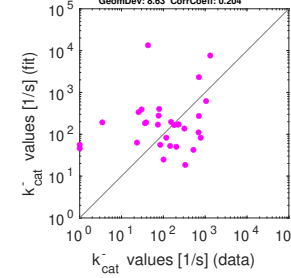
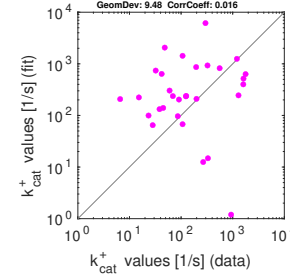
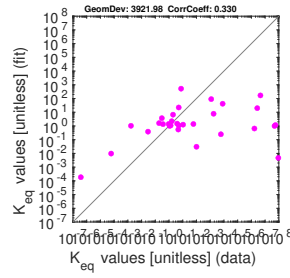
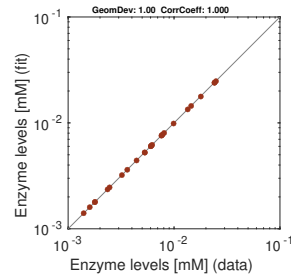
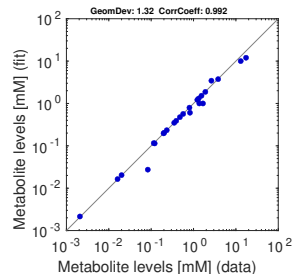


Figure 12: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

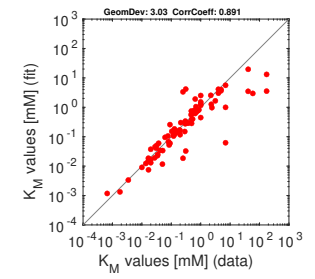
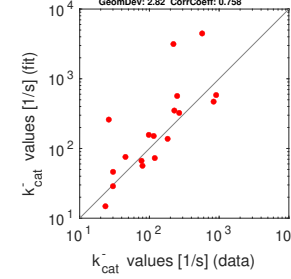
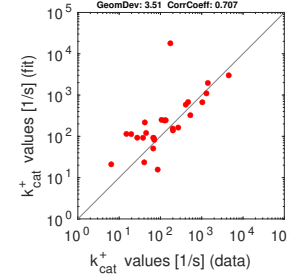
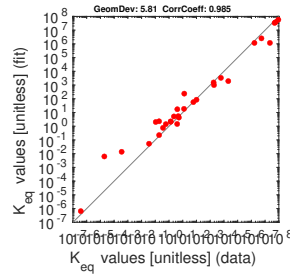
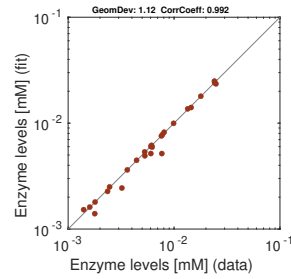
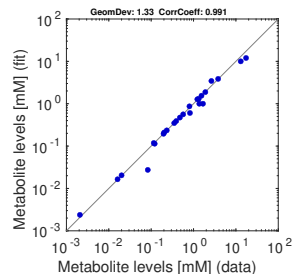
(c) K_{eq} values

(d) k_{cat}^+ values

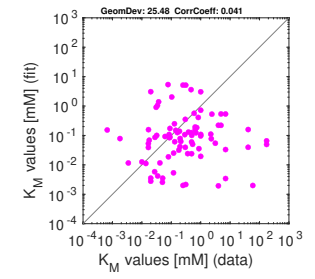
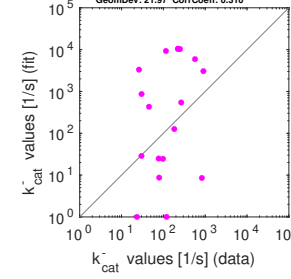
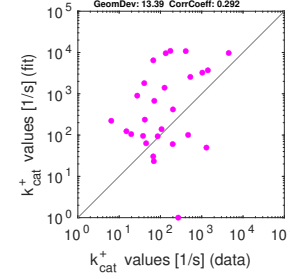
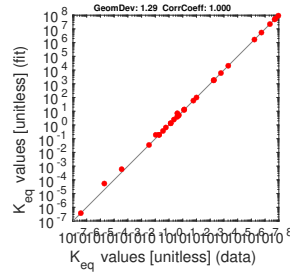
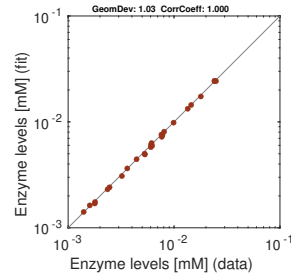
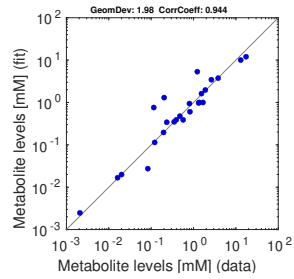
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

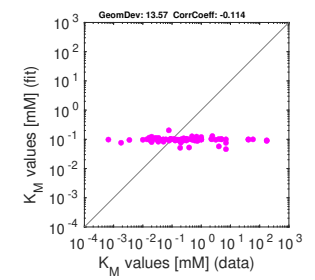
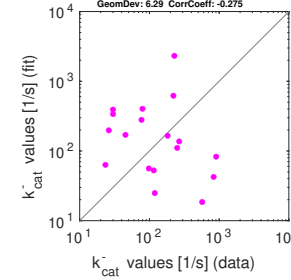
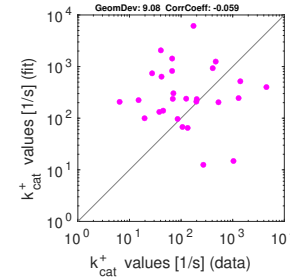
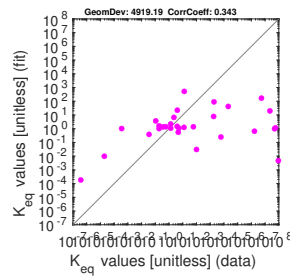
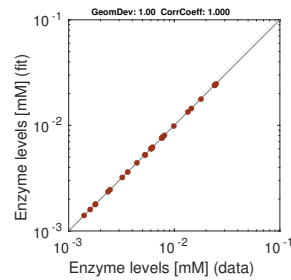
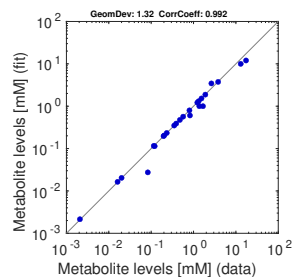


Figure 13: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

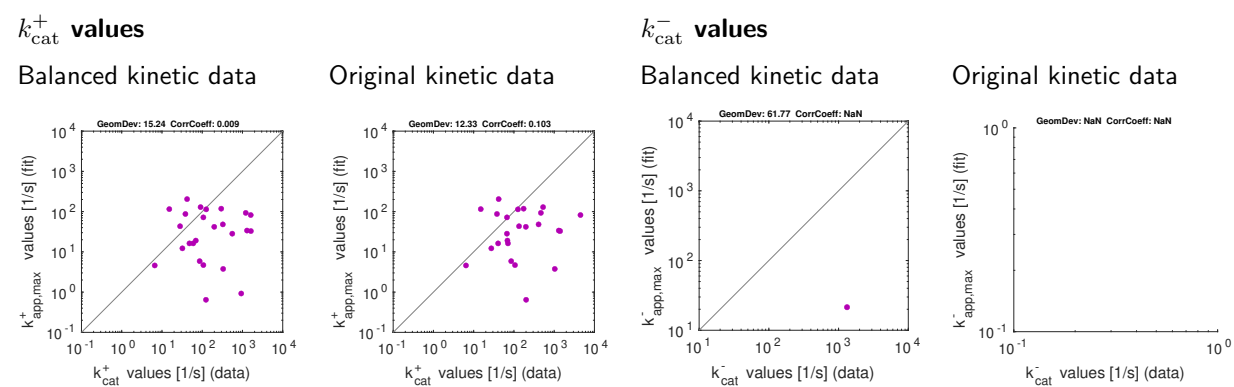


Figure 14: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].

5 E. coli Glucose data with $\alpha = 0.5$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

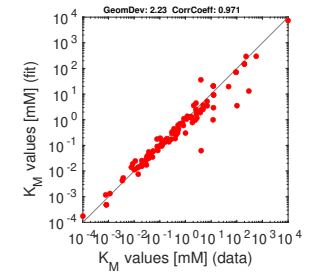
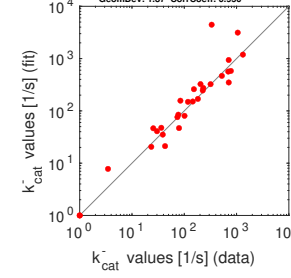
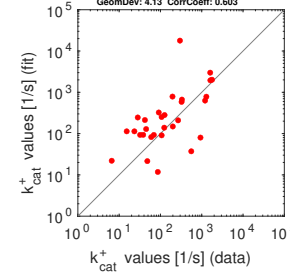
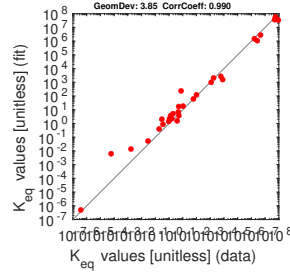
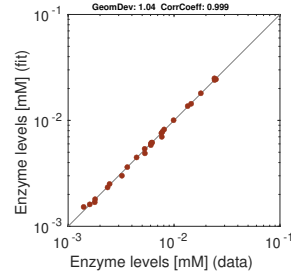
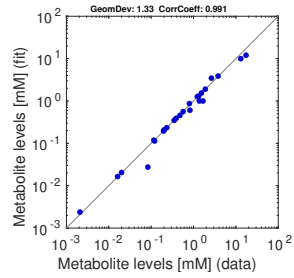
(c) K_{eq} values

(d) k_{cat}^+ values

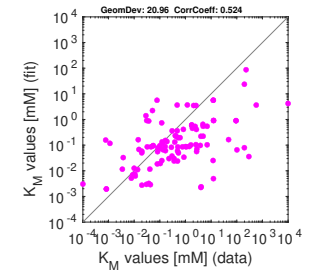
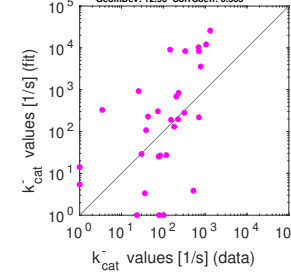
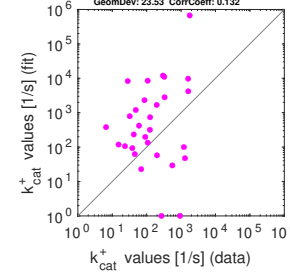
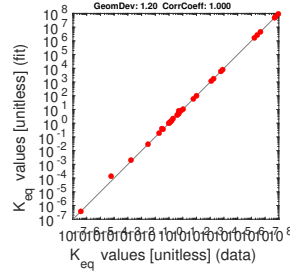
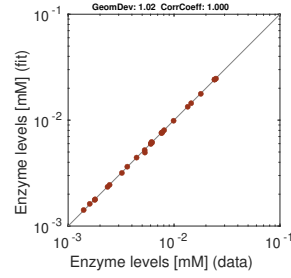
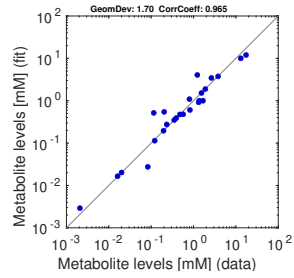
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

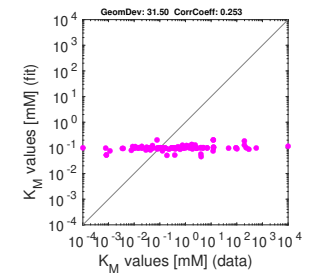
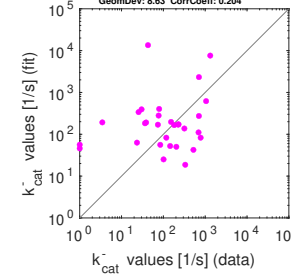
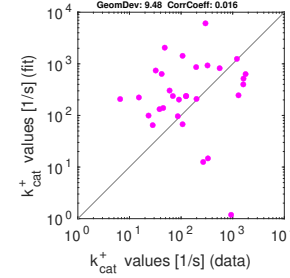
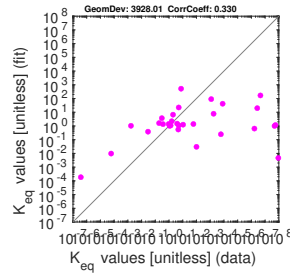
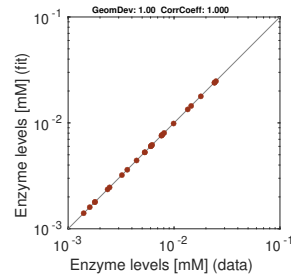
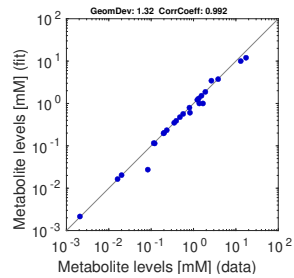


Figure 15: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

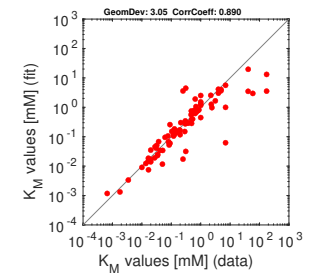
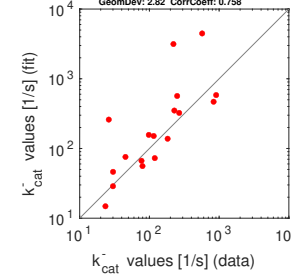
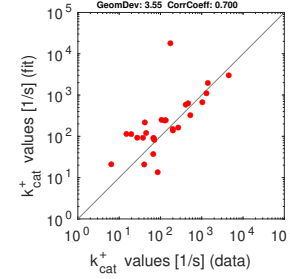
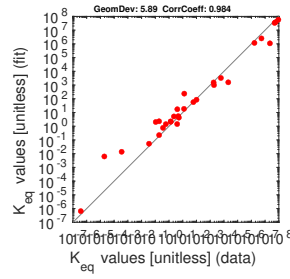
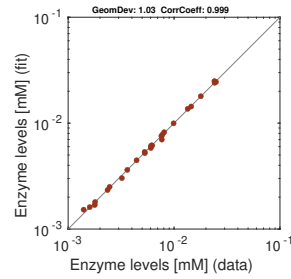
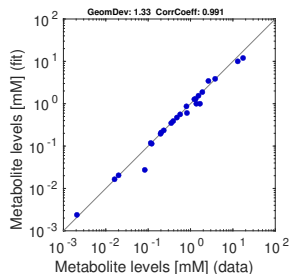
(c) K_{eq} values

(d) k_{cat}^+ values

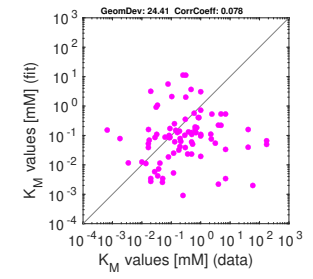
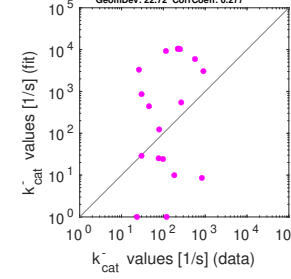
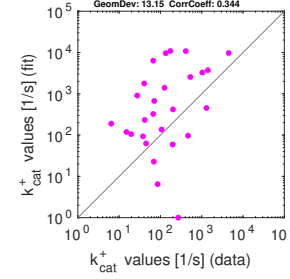
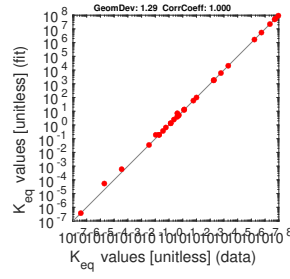
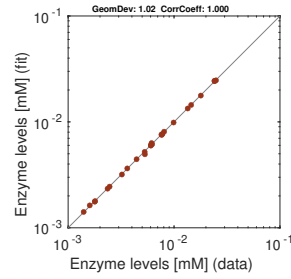
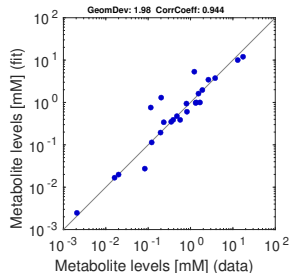
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

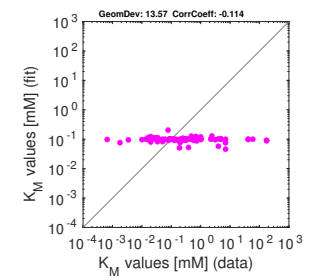
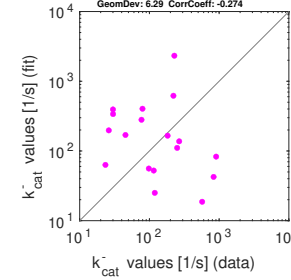
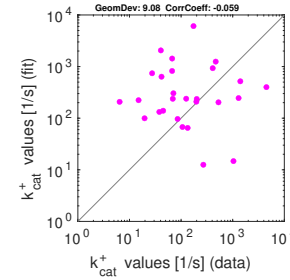
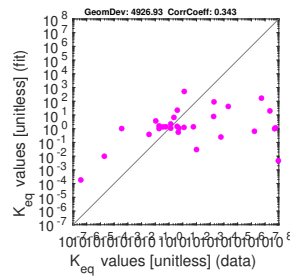
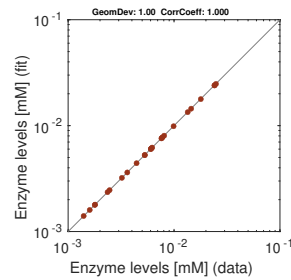
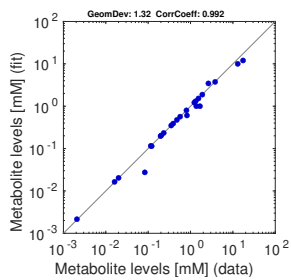


Figure 16: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

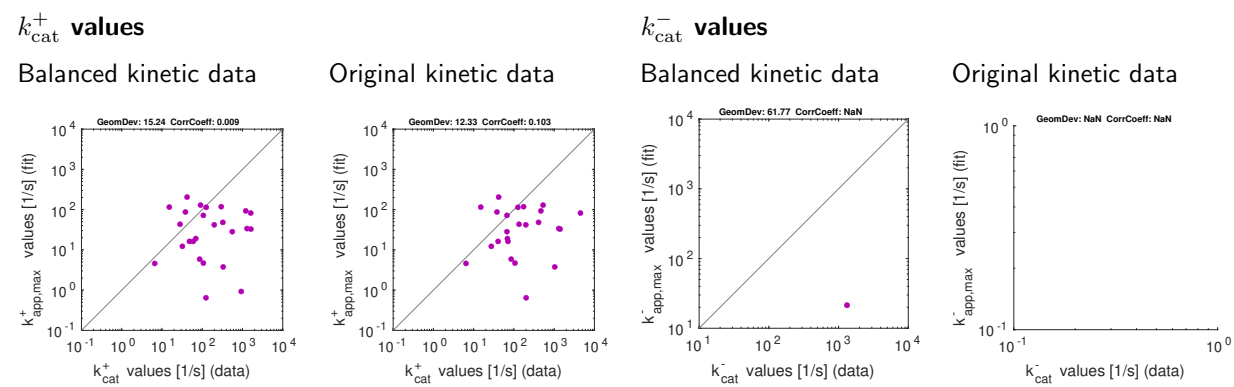


Figure 17: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].

6 E. coli Glucose data with $\alpha = 1$

E. coli model (aerobic growth on glucose), balanced kinetic data

(a) Metabolites

(b) Enzymes

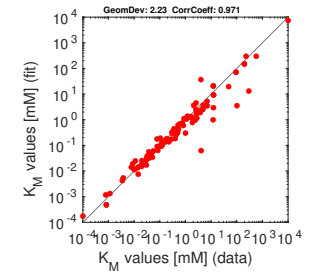
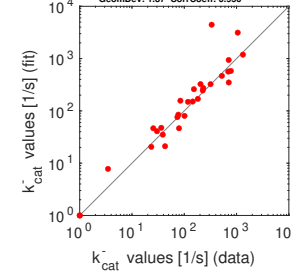
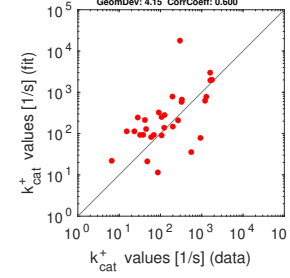
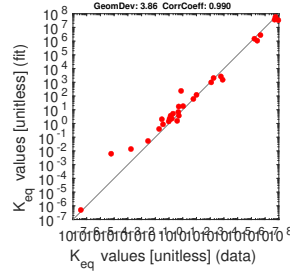
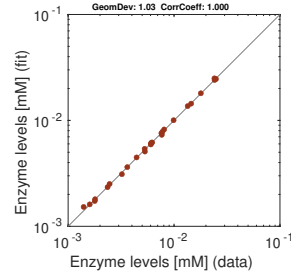
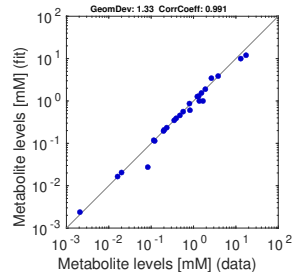
(c) K_{eq} values

(d) k_{cat}^+ values

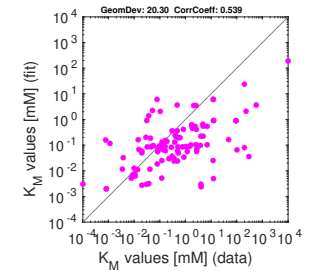
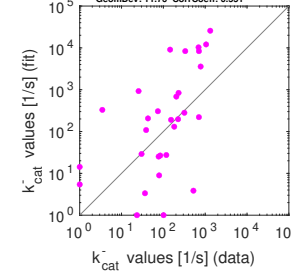
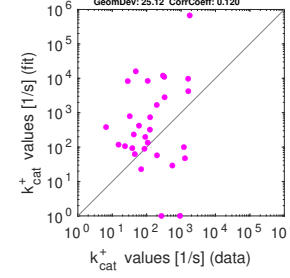
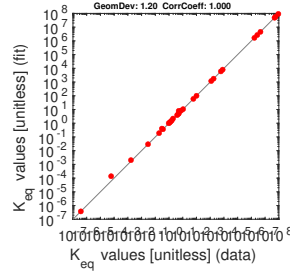
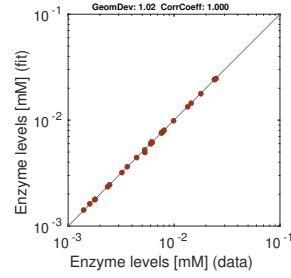
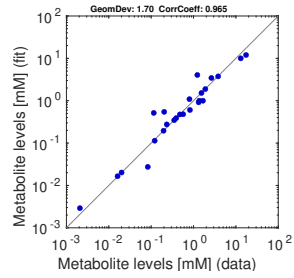
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

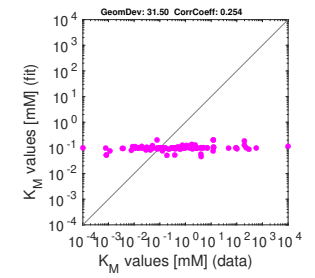
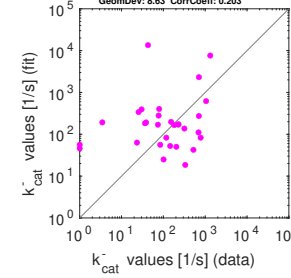
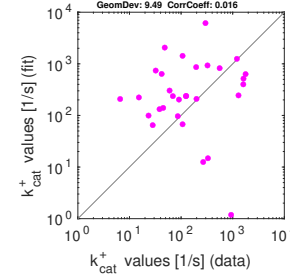
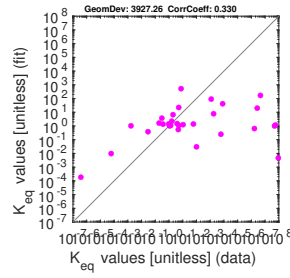
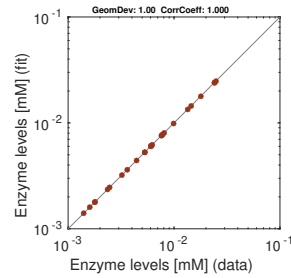
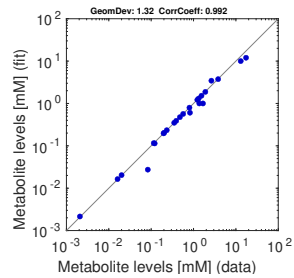


Figure 18: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). The kinetic data stem from previous parameter balancing based on *in-vitro* data. Top: estimation using kinetic data. Centre: estimation using equilibrium constants as the only kinetic data. Bottom: estimation without usage of kinetic data. The same metabolite, enzyme, and kinetic data were used in [?].

E. coli central metabolism model (aerobic growth on glucose), in-vitro kinetic data

(a) Metabolites

(b) Enzymes

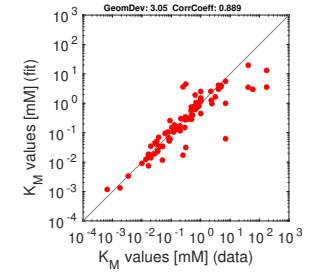
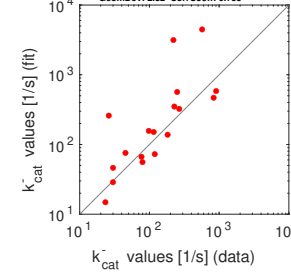
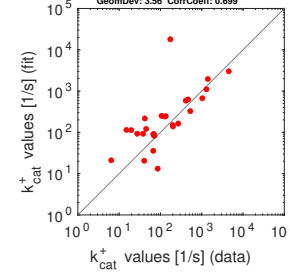
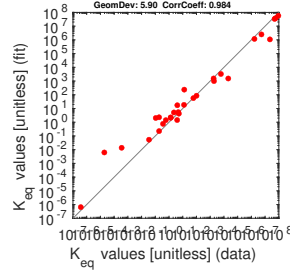
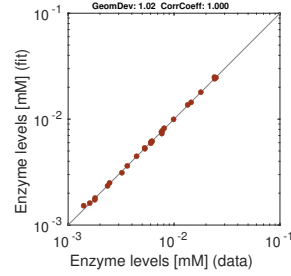
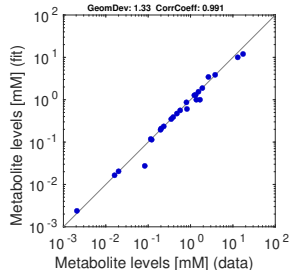
(c) K_{eq} values

(d) k_{cat}^+ values

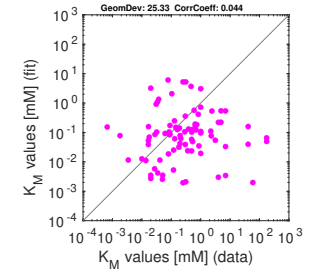
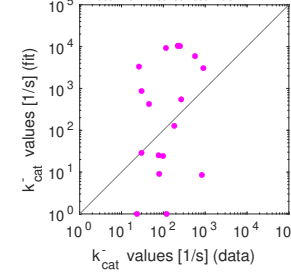
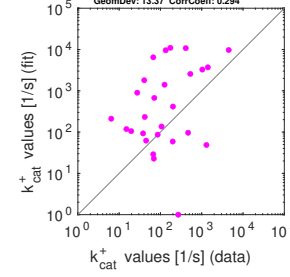
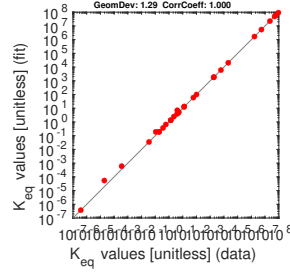
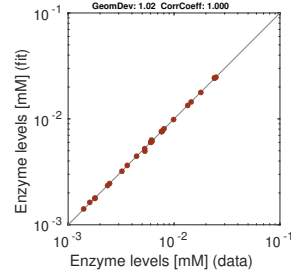
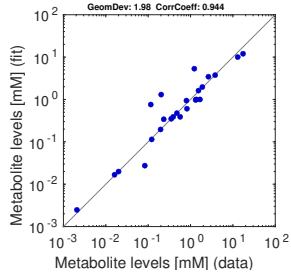
(e) k_{cat}^- values

(f) K_M values

With kinetic data



With K_{eq} data only



Without kinetic data

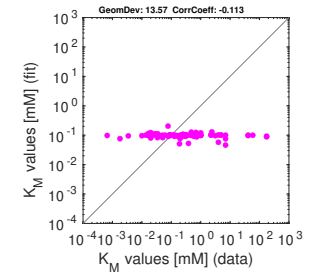
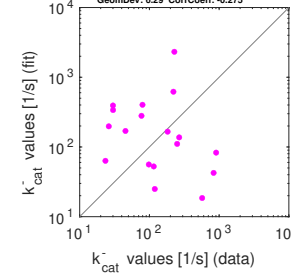
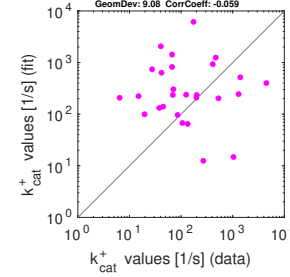
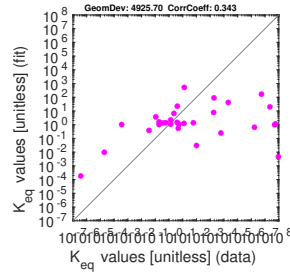
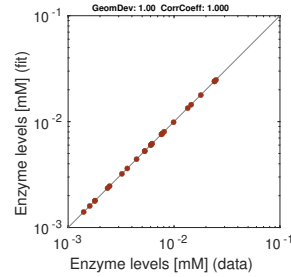
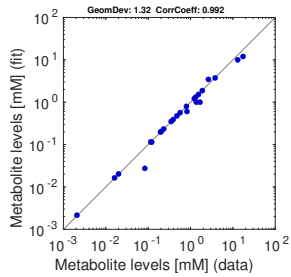


Figure 19: Results for *E. coli* central metabolism with experimental data (aerobic growth on glucose). Same as Figure 18, but based on original kinetic *in-vitro* data instead of balanced kinetic data.

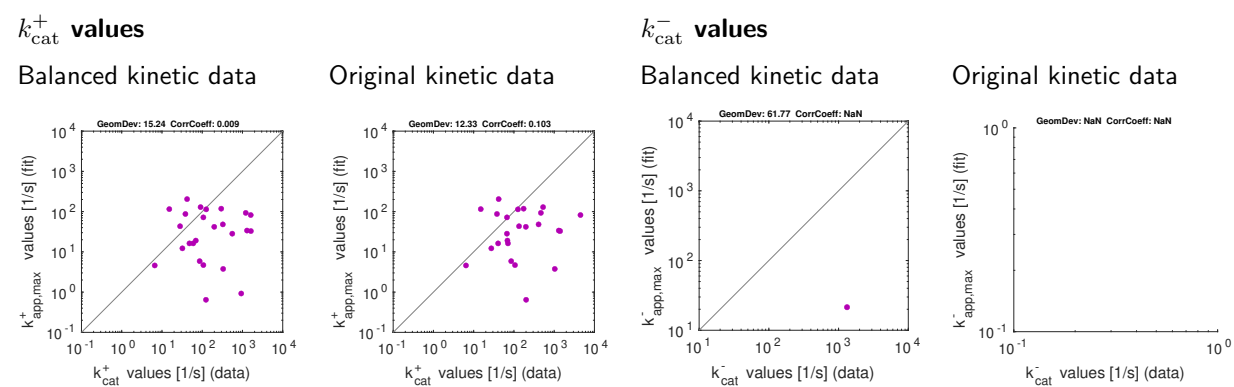


Figure 20: Catalytic constants in *E. coli* central metabolism model (aerobic growth on glucose), estimated by kinetic profiling [?].