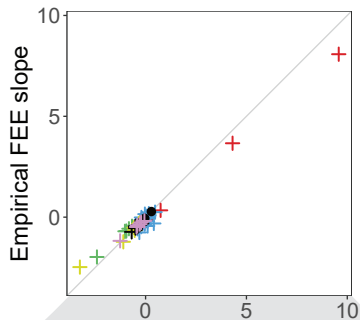


Effective interaction  
averaged across backgrounds

$$\tilde{\varepsilon}_{ij} = \frac{\langle \varepsilon_{ij} \rangle \langle \Delta F_{j/B(i)} \rangle}{\sum_{k \neq i} \langle \Delta F_k \rangle_{B(i)}^2}$$



Ecological data sets:

- + Above-ground plant biomass
- + Phytoplankton biomass
- + Bacterial xylose oxidation
- + Bacterial starch hydrolysis
- + Bacterial butyrate secretion
- + Bacterial pyoverdine secretion

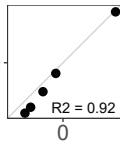
Genetic data set:

- *E. coli* fitness

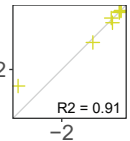
expected from averaged interactions,  $b_i \approx \sum_{j \neq i} \tilde{\varepsilon}_{ij}$

Empirical  
FEE slope

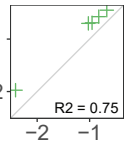
*E. coli* fitness



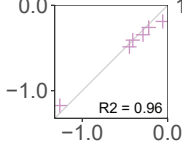
Above-ground  
plant biomass



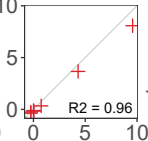
Phytoplankton  
biomass



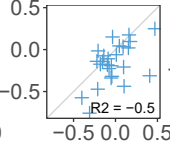
Bacterial  
xylose  
oxidation



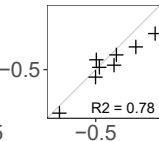
Bacterial  
starch  
hydrolysis



Bacterial  
butyrate  
secretion



Bacterial  
pyoverdine  
secretion



expected from averaged interactions,  $b_i \approx \sum_{j \neq i} \tilde{\varepsilon}_{ij}$