Summary of emulation comparisons (variance = v_k

- Functions: borehole, OTL circuit, Wing weight, and piston
- Number of locations: 25
- Number of training parameters: 100
- x are sampled uniformly in $[0,1]^{d_x}$
- θ are sampled from latin hypercube sampling in $[0,1]^{d_\theta}$
- Test parameters are sampled uniformly in $[0,1]^{d_\theta}$

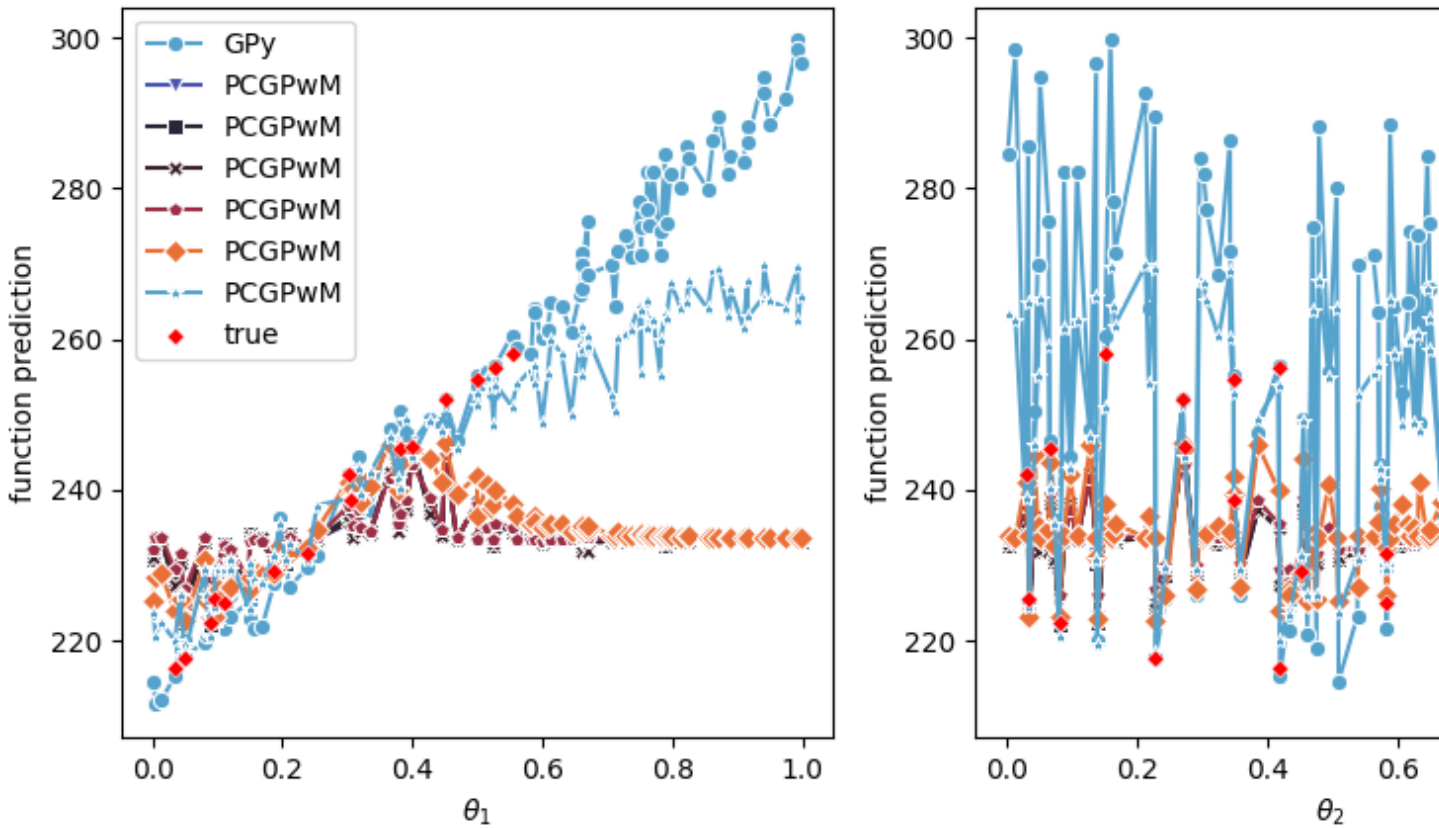
Comparing between choices of variance constants β_k's

Main observation:

- If a linear trend is present in one of the parameters, emulator prediction is better with very large β_k's.
- Often MLE does not work in such cases.

Example: Wing weight function

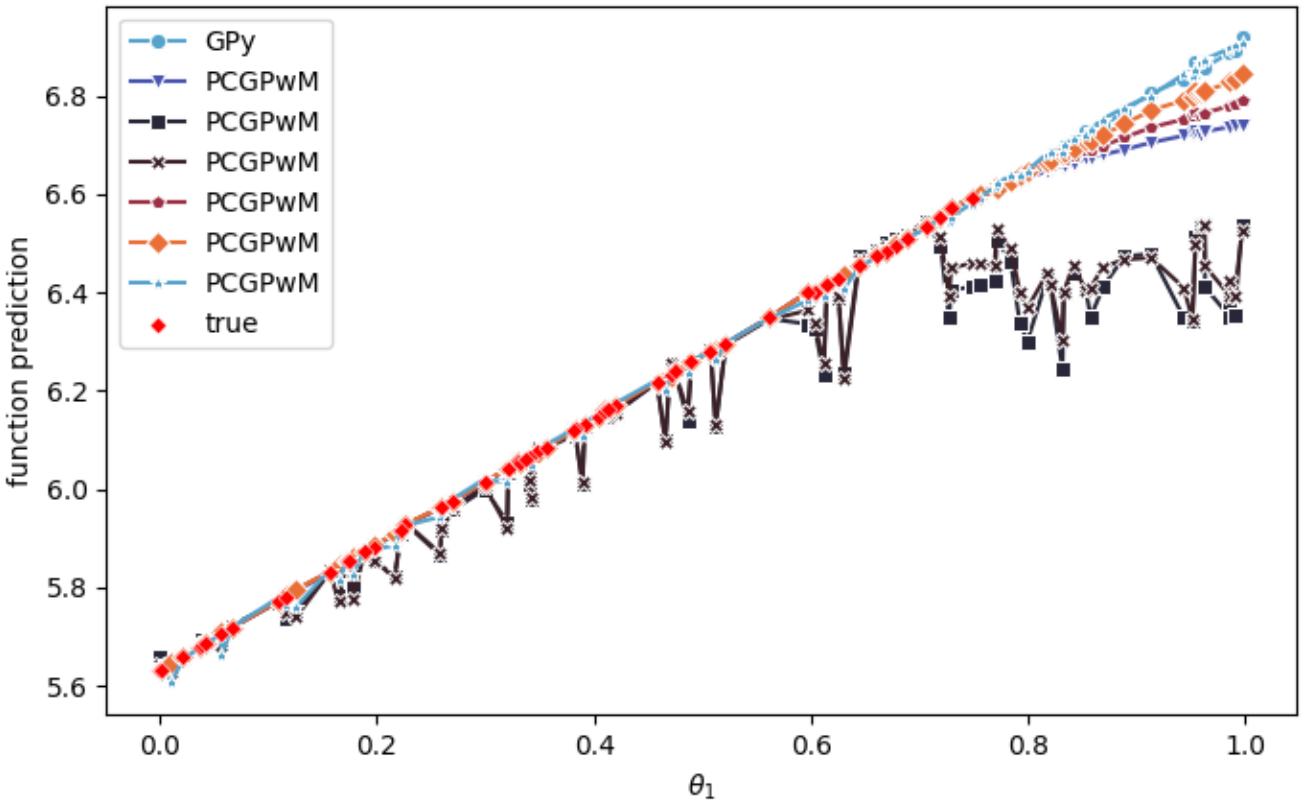
Failure mechanism: if $min(x) < 0.05$ and $\max(\theta) > 0.8$



*legend (top to bottom):
GPy, PCGPwM (optimized, $\log(\beta_k)$ = -6, -4, 0, 4, 20)

Example: OTL circuit function

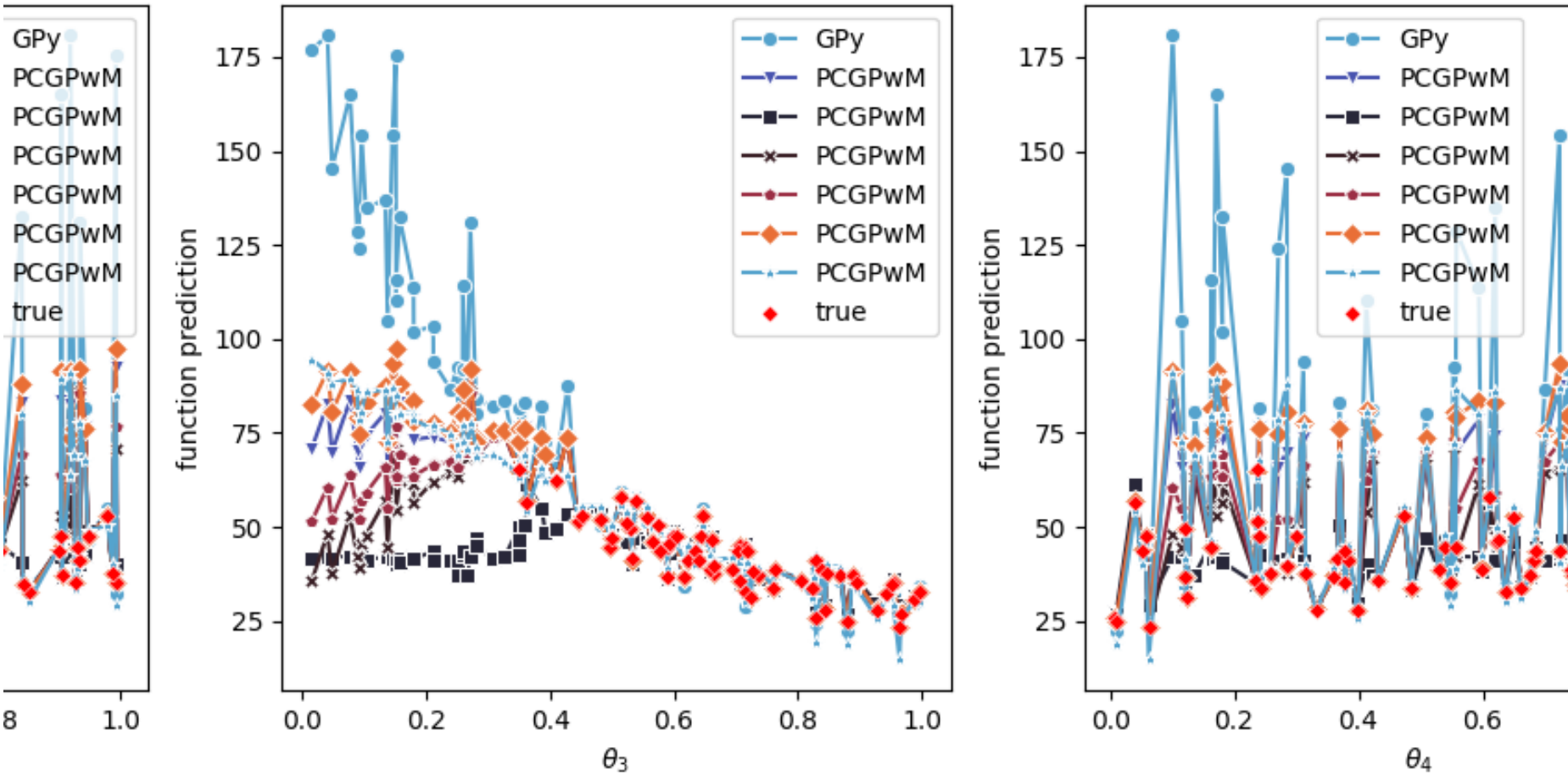
Failure mechanism: if $\max(x) > 0.75$ and $\max(\theta) > 0.6$



*legend (top to bottom):
GPy, PCGPwM (optimized,log(β_k)= -6, -4, 0, 4, 20)

Example: borehole function

Failure mechanism: if $f(x, \theta) > f(x, [0.5]^{d_\theta})$



*legend (top to bottom):
GPy, PCGPwM (optimized, $\log(\beta_k)$ = -6, -4, 0, 4, 20)

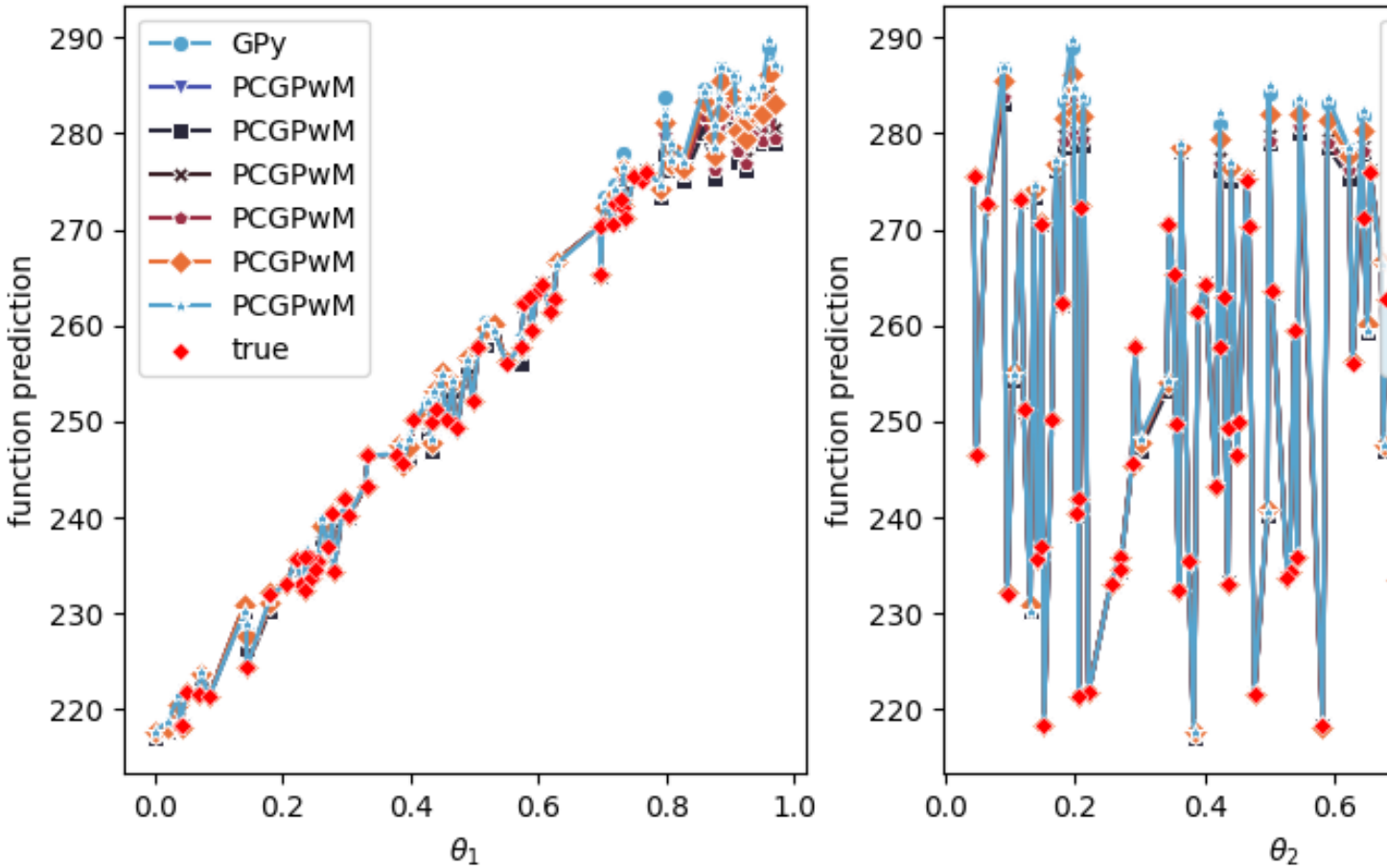
Summary of emulation comparisons (variance $= v_k/(1 - v_k)$

- Functions: borehole, OTL circuit, Wing weight, and piston
- Number of locations: 25
- Number of training parameters: 100
- x are sampled uniformly in $[0, 1]^{d_x}$
- θ are sampled from latin hypercube sampling in $[0, 1]^{d_\theta}$
- Test parameters are sampled uniformly in $[0, 1]^{d_\theta}$

Comparing between choices of variance constants β_k's

Example: Wing weight function

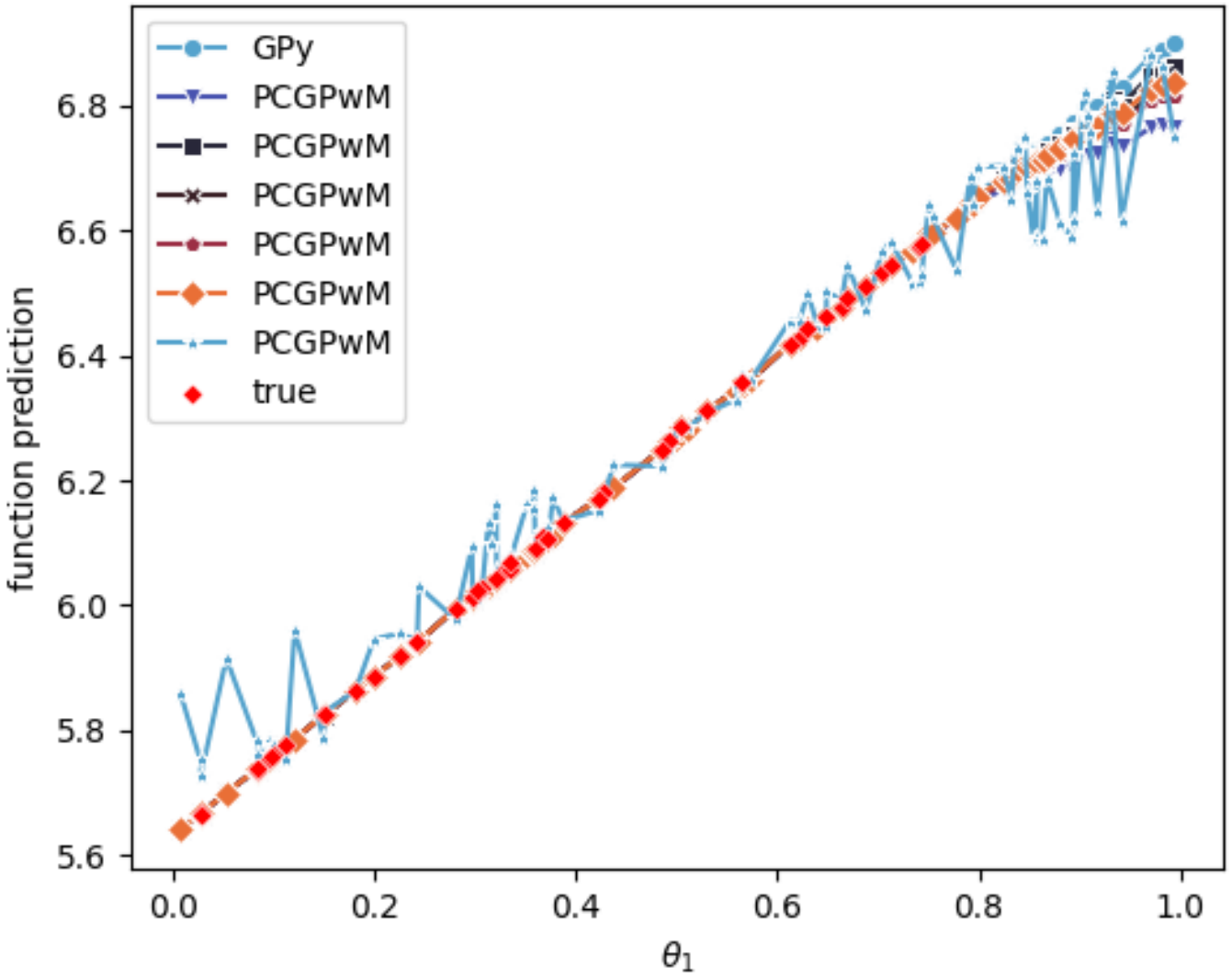
Failure mechanism: if $min(x) < 0.05$ and $\max(\theta) > 0.8$



*legend (top to bottom):
GPy, PCGPwM (optimized, $\log(\beta_k)$ = -6, -4, 0, 4, 20)

Example: OTL circuit function

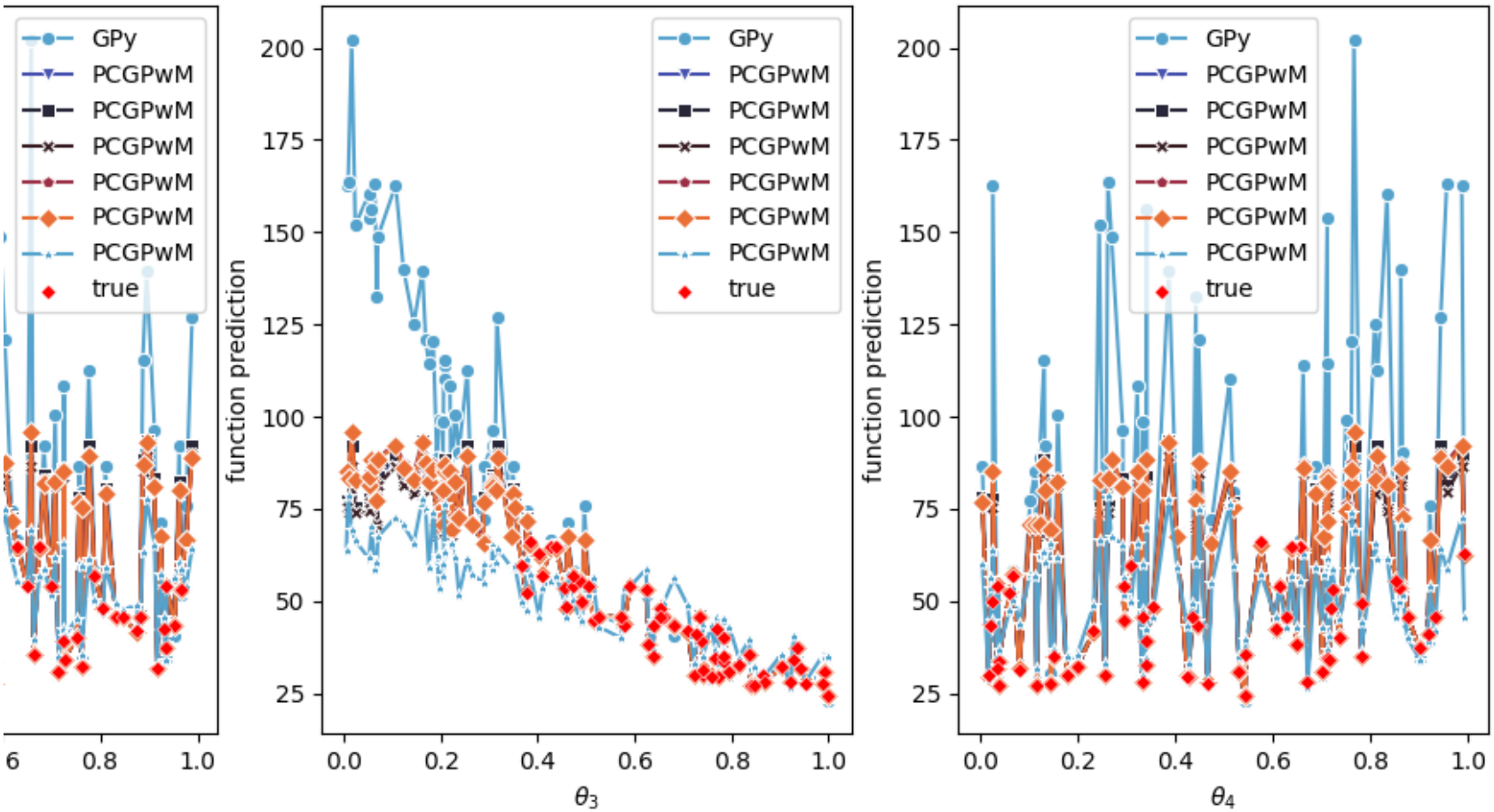
Failure mechanism: if $\max(x) > 0.75$ and $\max(\theta) > 0.6$



*legend (top to bottom):

Example: borehole function

Failure mechanism: if $f(x, \theta) > f(x, [0.5]^{d_\theta})$



*legend (top to bottom):
GPy, PCGPwM (optimized, log(β_k) = -6, -4, 0, 4, 20)