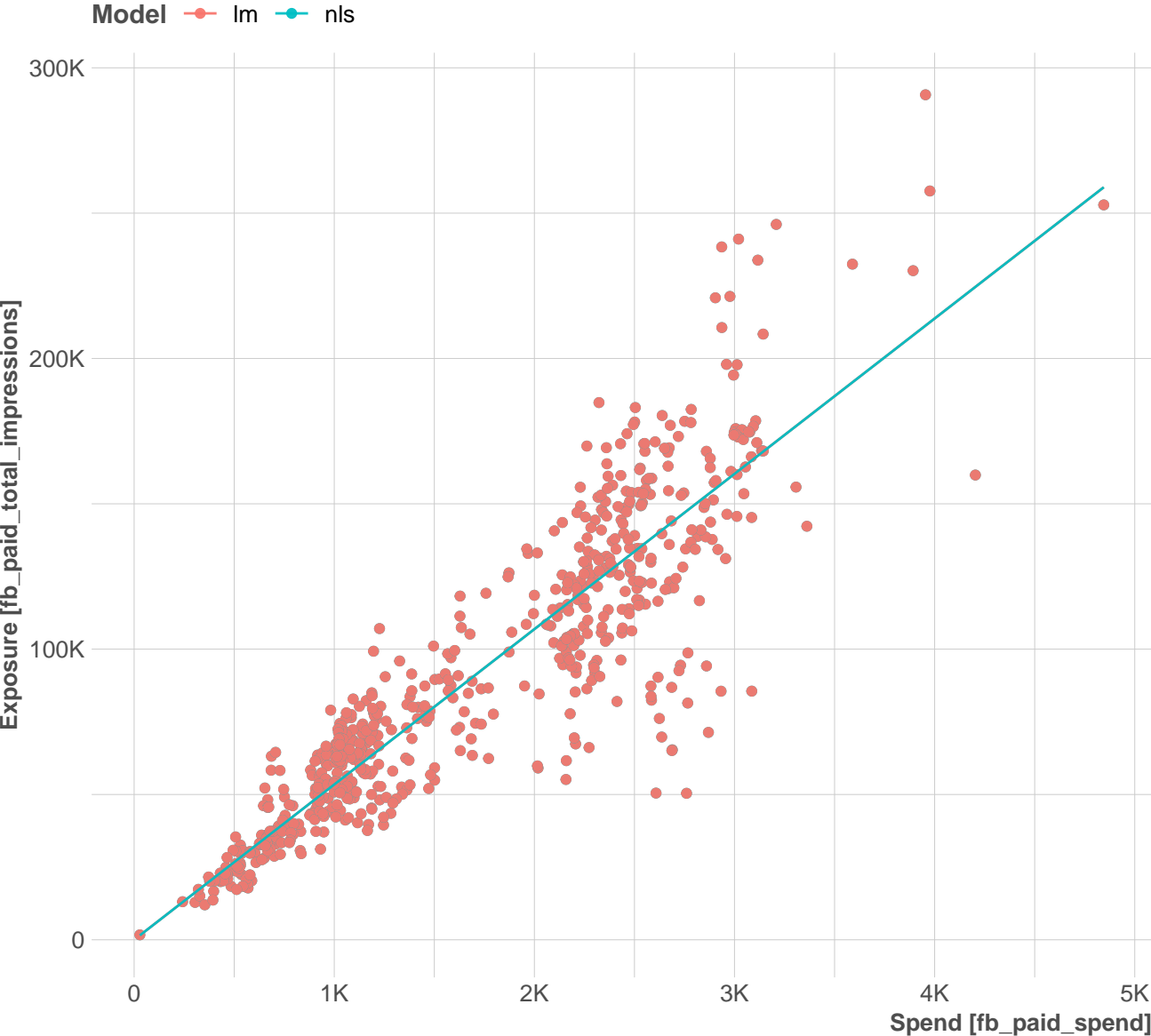
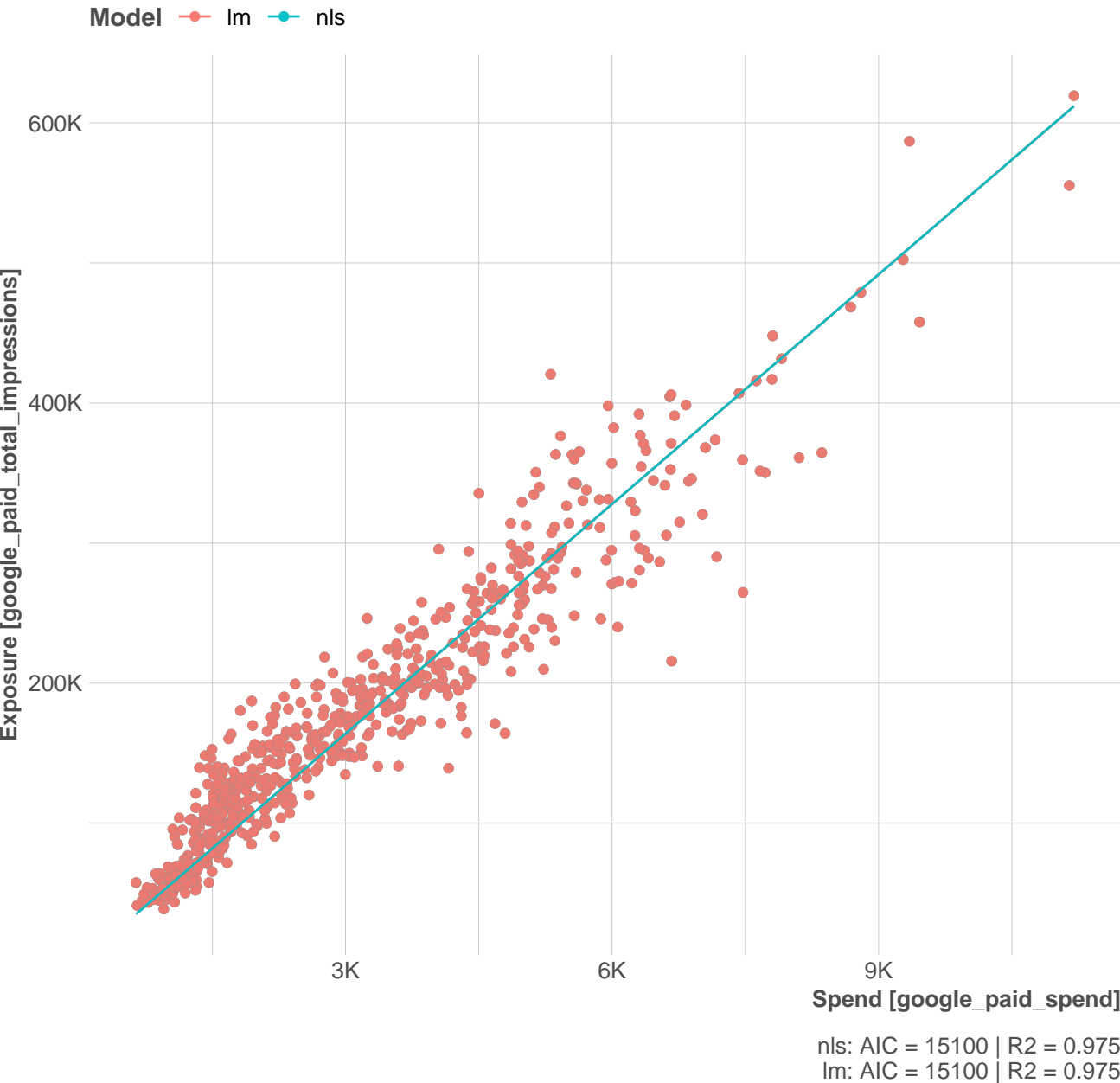


Exposure–Spend Models Fit Comparison

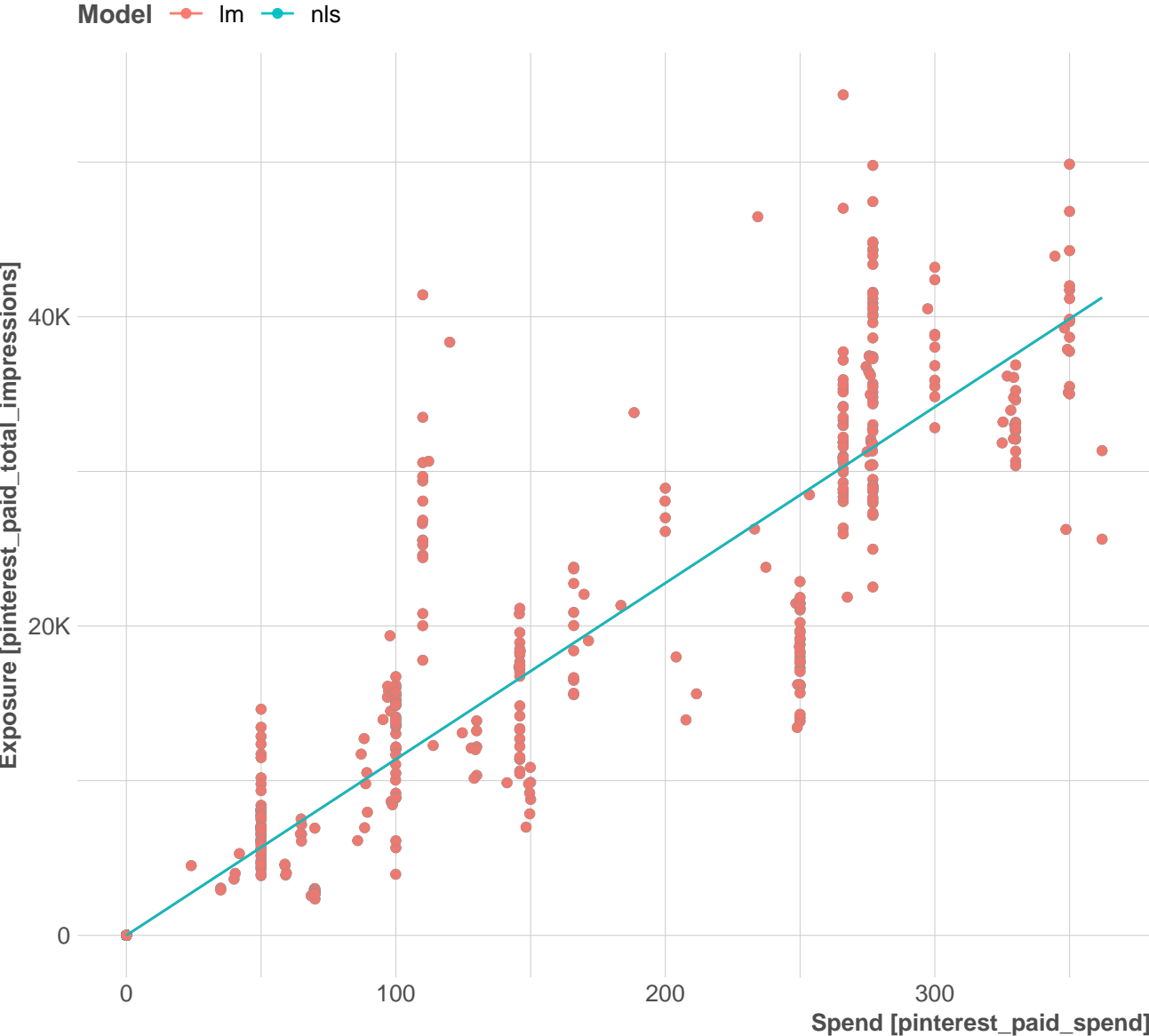


nls: AIC = 14700 | R2 = 0.956
Im: AIC = 14700 | R2 = 0.956

Exposure–Spend Models Fit Comparison

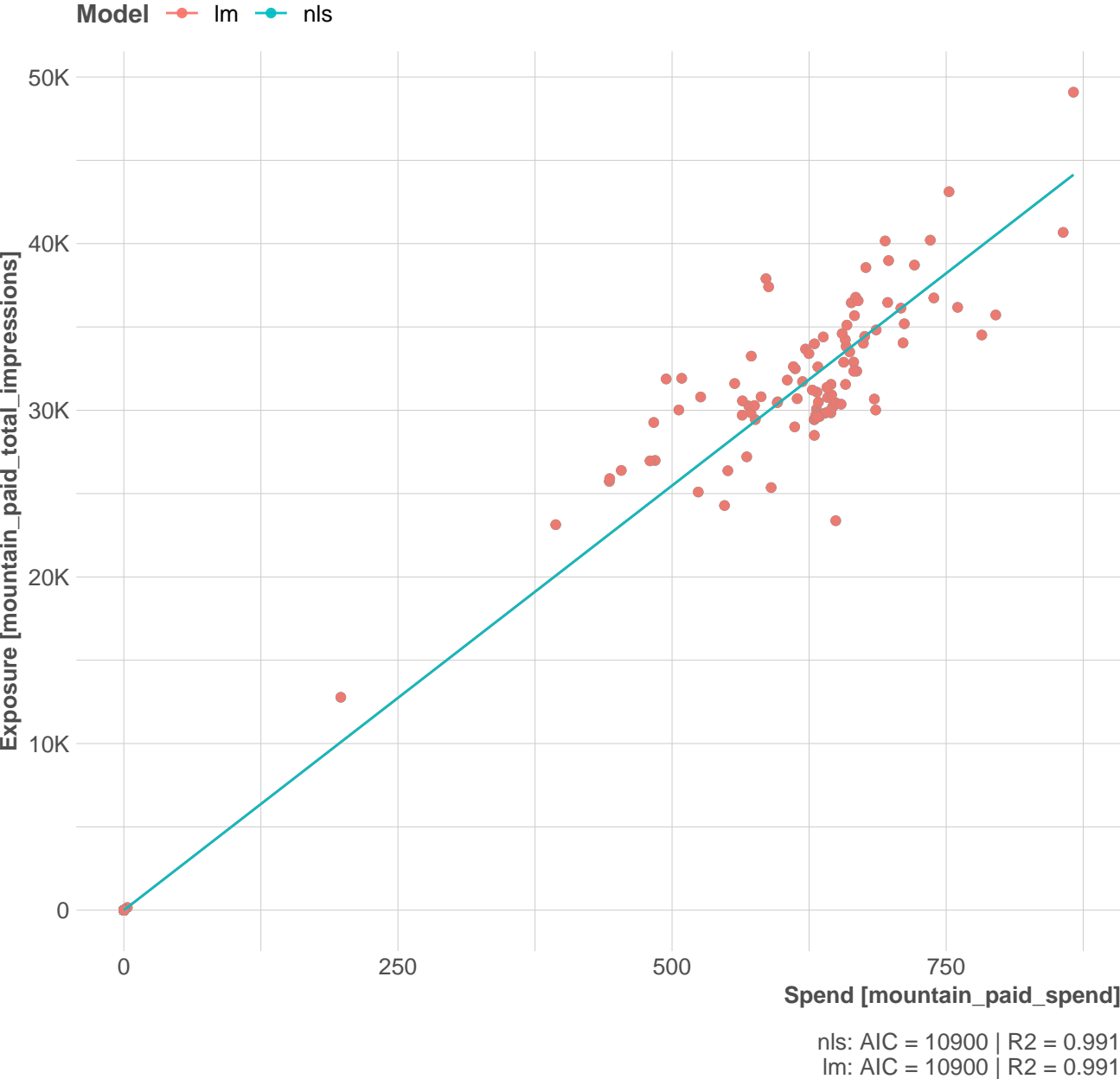


Exposure–Spend Models Fit Comparison

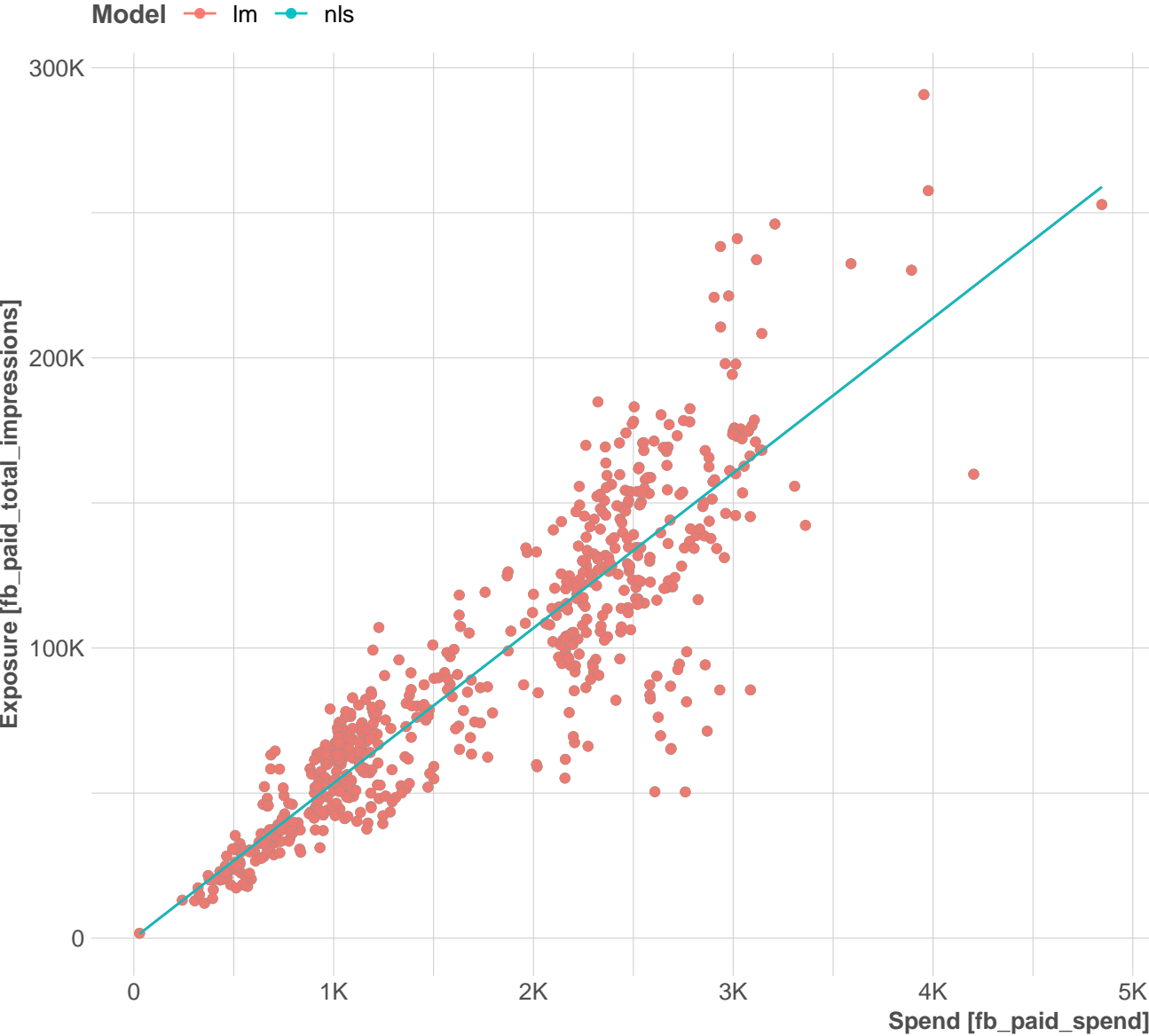


nls: AIC = 12800 | R2 = 0.93
Im: AIC = 12800 | R2 = 0.93

Exposure–Spend Models Fit Comparison

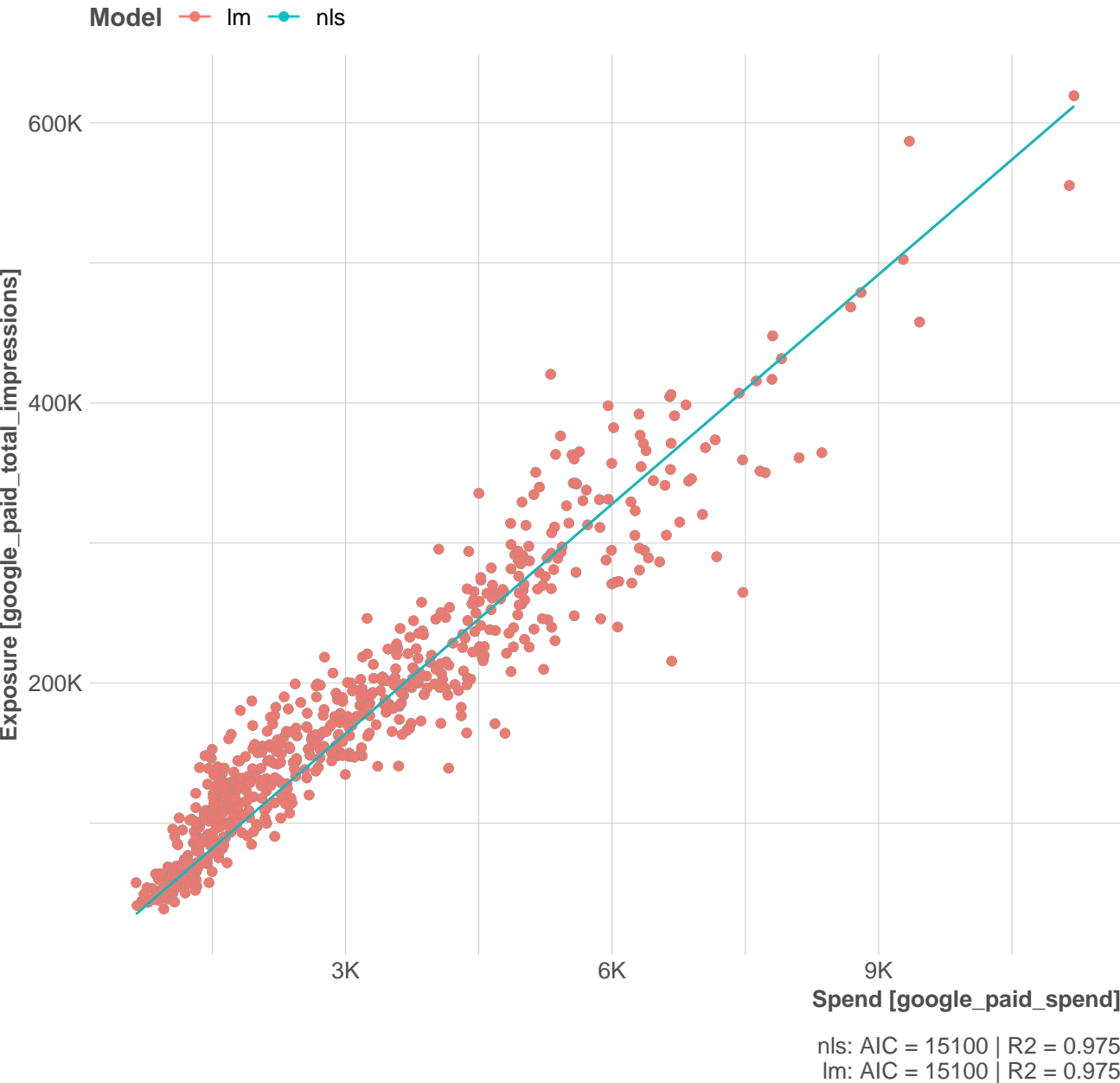


Exposure–Spend Models Fit Comparison



nls: AIC = 14700 | R2 = 0.956
Im: AIC = 14700 | R2 = 0.956

Exposure–Spend Models Fit Comparison



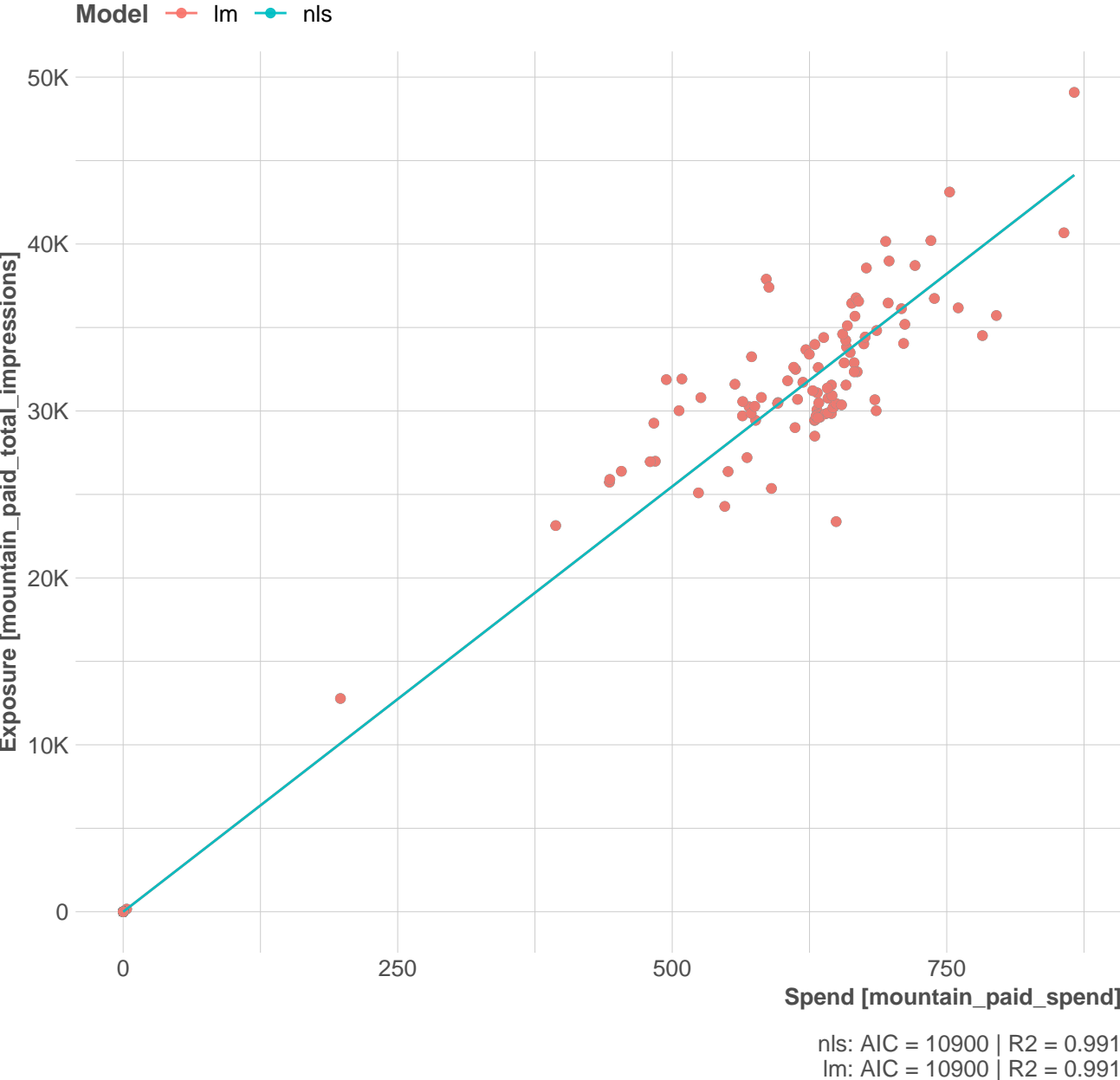
Exposure–Spend Models Fit Comparison



nls: AIC = 12800 | R2 = 0.93

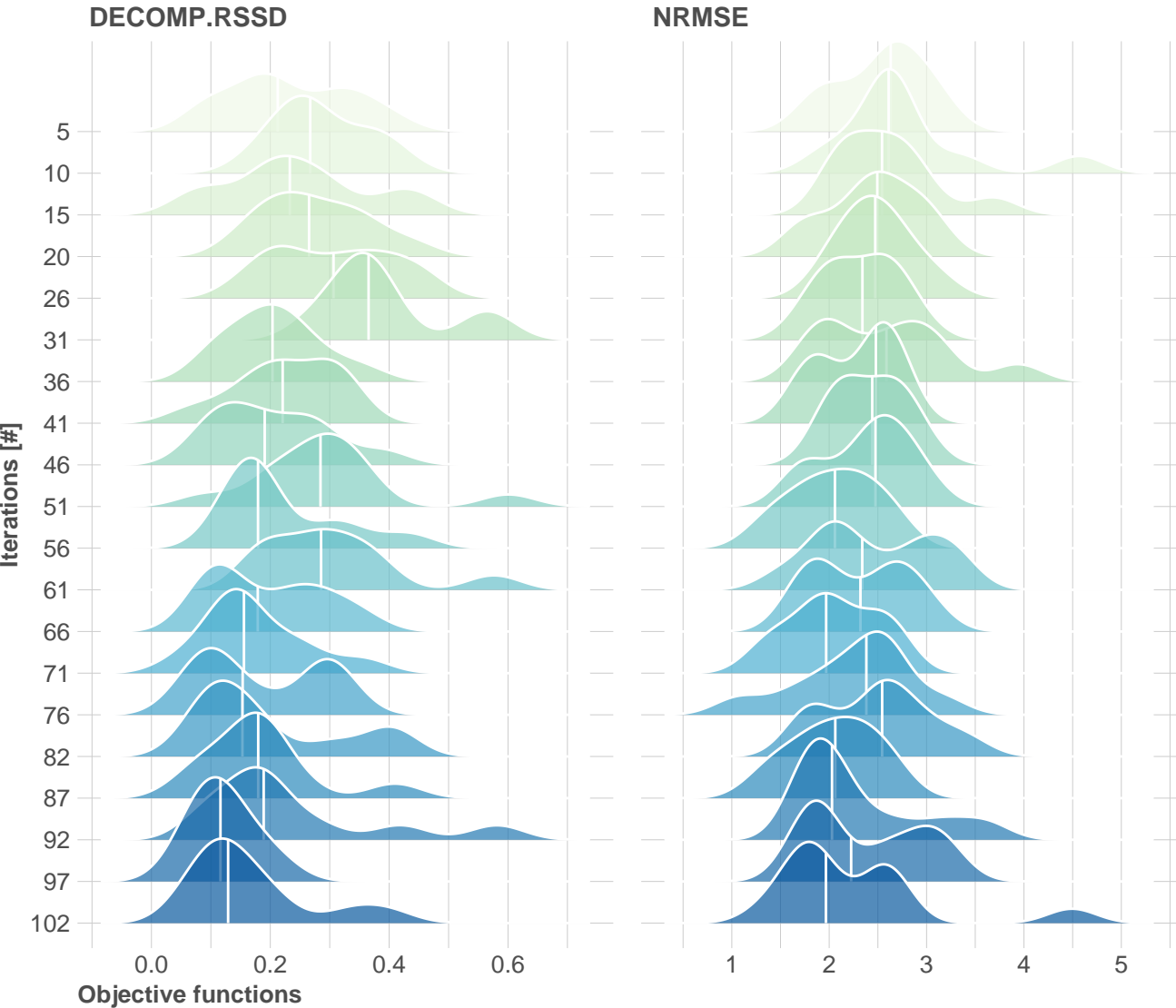
lm: AIC = 12800 | R2 = 0.93

Exposure–Spend Models Fit Comparison



Objective convergence by iterations quantiles

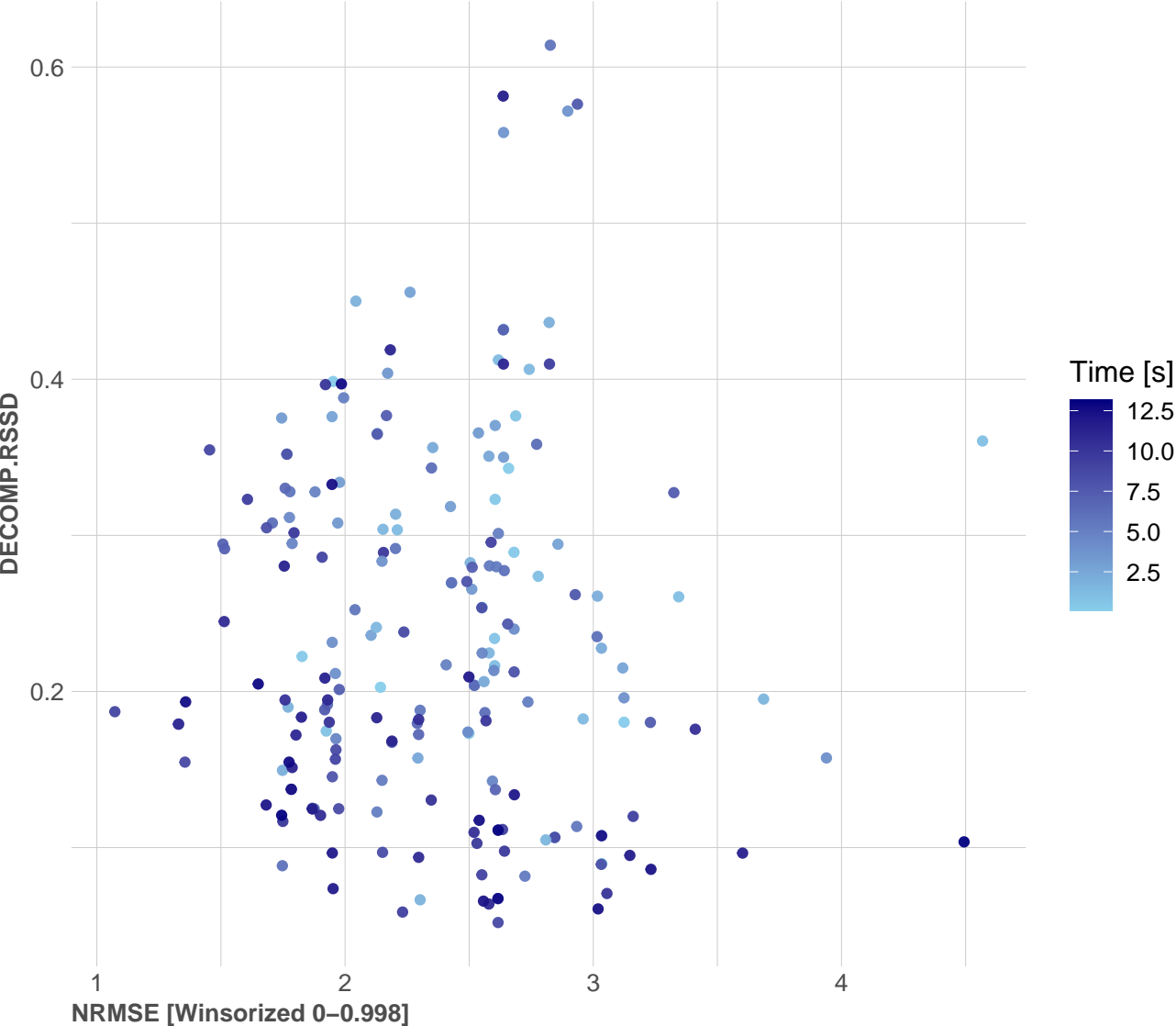
2 trials with 102 iterations each using TwoPointsDE



DECOMP.RSSD NOT converged: sd@qt.20 0.1 > 0.1 & |med@qt.20| 0.13 > 0.013
NRMSE NOT converged: sd@qt.20 0.83 > 0.56 & |med@qt.20| 2 > 1.5

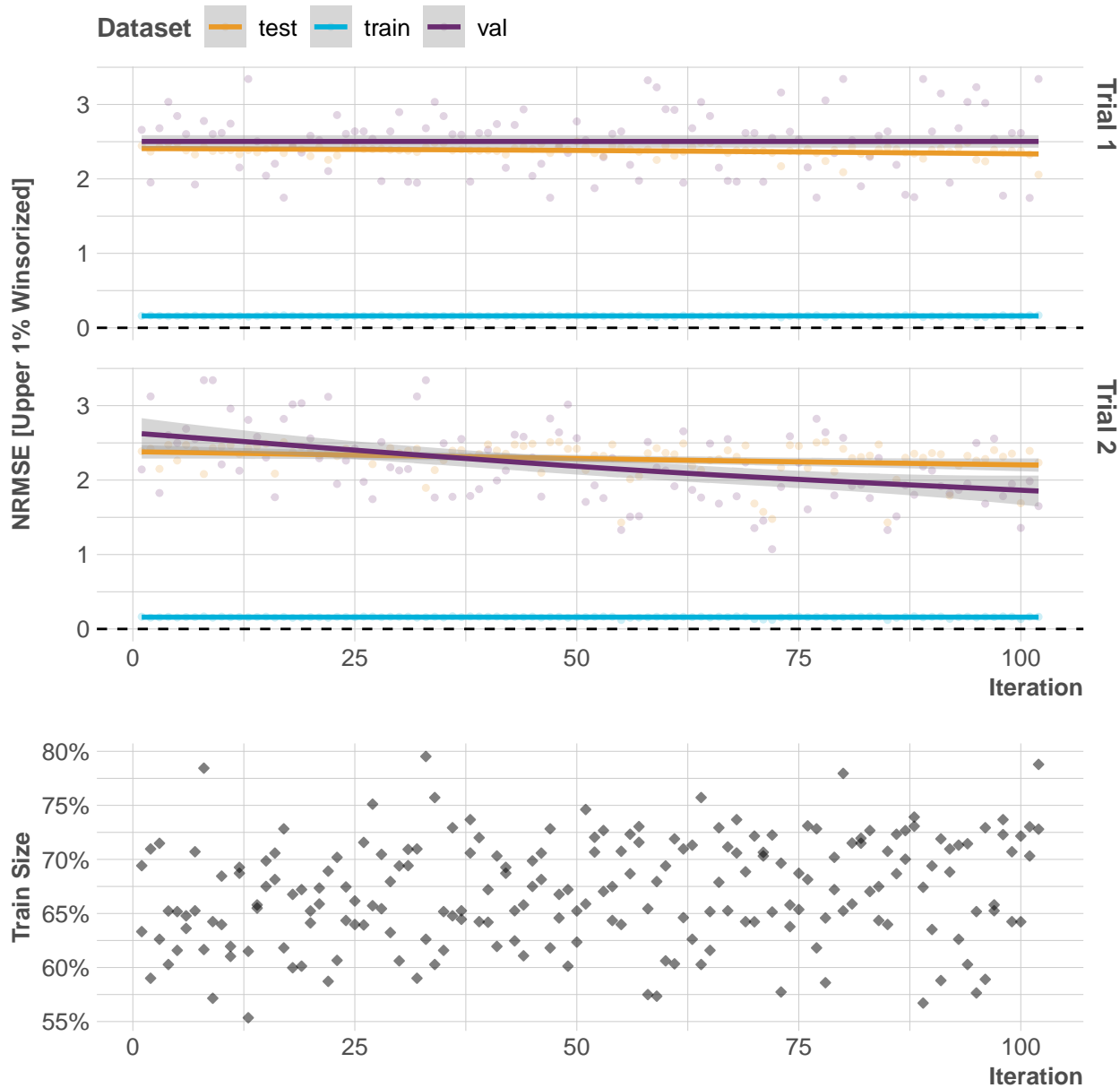
Multi-objective evolutionary performance

2 trials with 102 iterations each using TwoPointsDE



DECOMP.RSSD NOT converged: sd@qt.20 0.1 > 0.1 & |med@qt.20| 0.13 > 0.013
NRMSE NOT converged: sd@qt.20 0.83 > 0.56 & |med@qt.20| 2 > 1.5

Time-series validation & Convergence

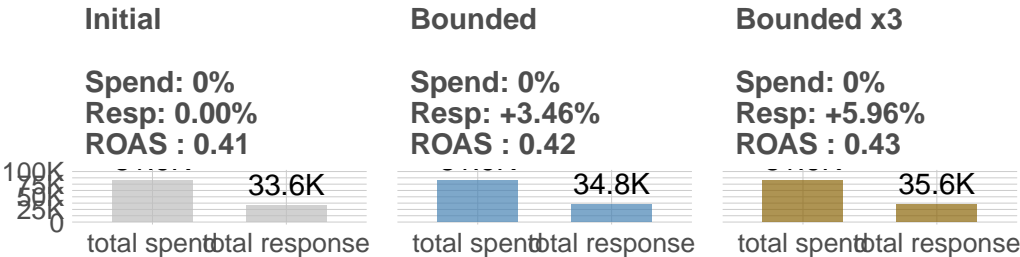


Budget Allocation Onepager for Model ID 1_92_1

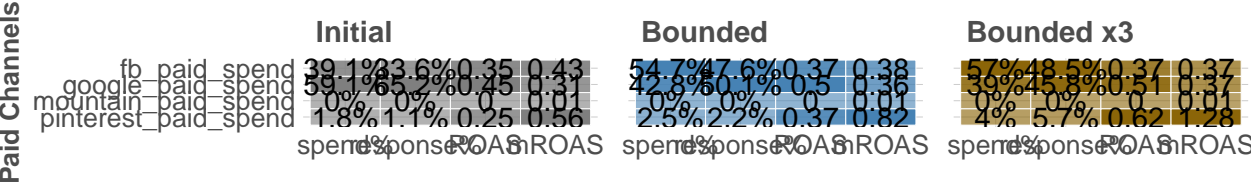
Adj.R2: train = 0.0775, val = 0.0863, test = -0.8987 | NRMSE: train = 0.166, val = 1.9

Simulation date range: 2023-12-31 to 2024-01-29 (30 days) | Scenario: max_response

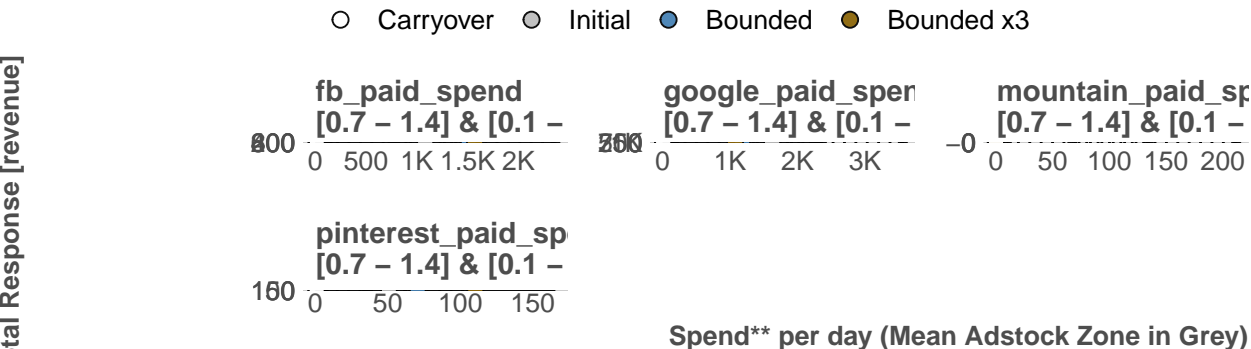
Total Budget Optimization Result



Budget Allocation per Channel*



Simulated Response Curve for Selected Allocation Period



* ROAS = total response / raw spend | mROAS = marginal response / marginal spend

* When reallocating budget, mROAS converges across media within respective bounds

** Dotted lines show budget optimization lower-upper ranges per media