Uncertainty in Non-Linear Regression

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Sample Curve Plots

You can also embed plots, for example:

Standard error estimate

Simulation study

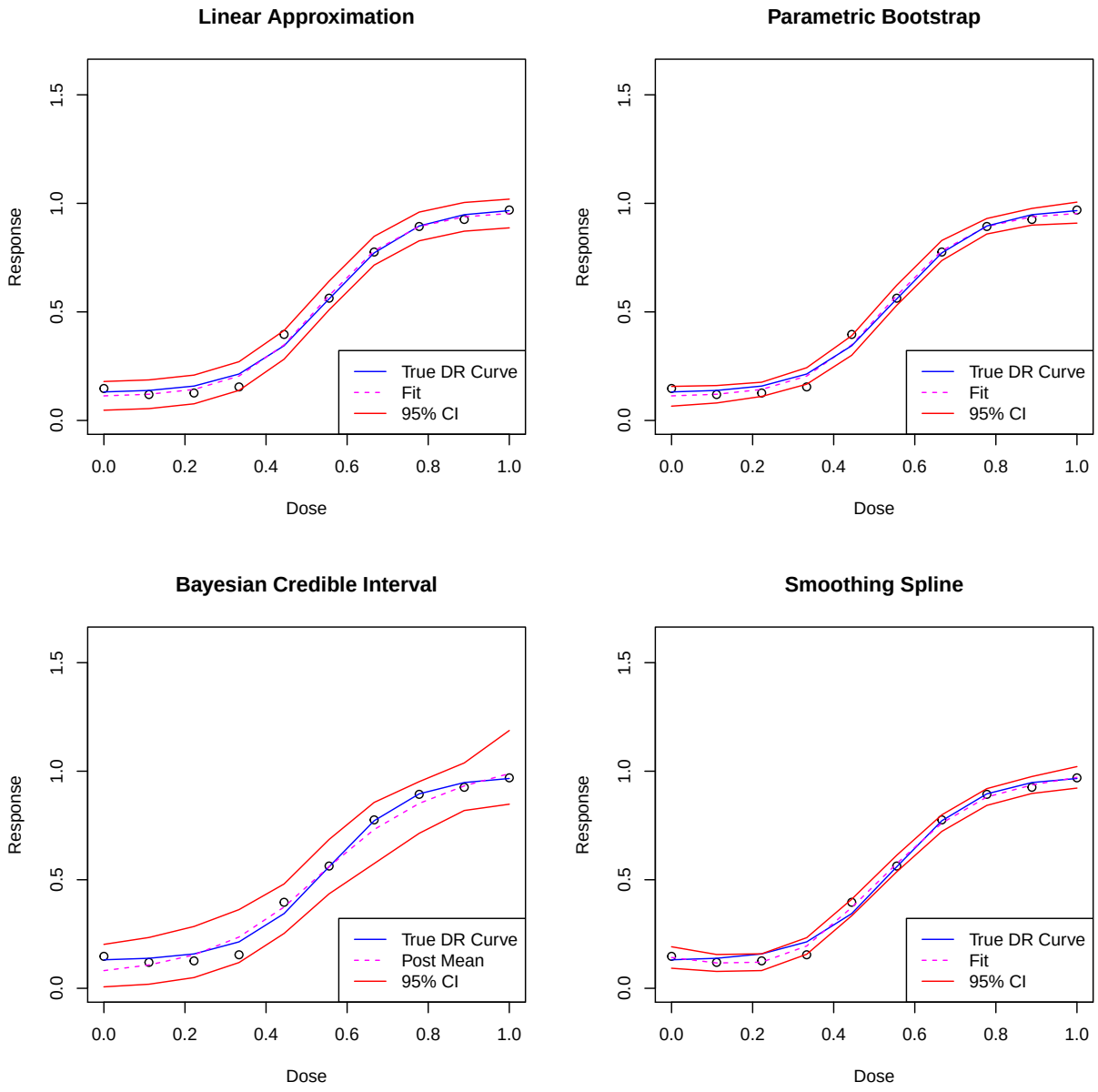

Figure 1: Example of the non-linear regression fits and interval estimates by four methods. (top) Least squares fit with 95% confidence intervals (red) estimated by linear approximation or parametric bootstrap. The true function used to generate the data is shown in blue. (bottom left) Bayesian non linear regression. Fit is the posterior mean of the regression line (purple dashed) along with a 95% credible interval (red). (bottom right) Fit estimated by a smoothing spline (purple dashed) with Bayesian 95% credible interval (red).

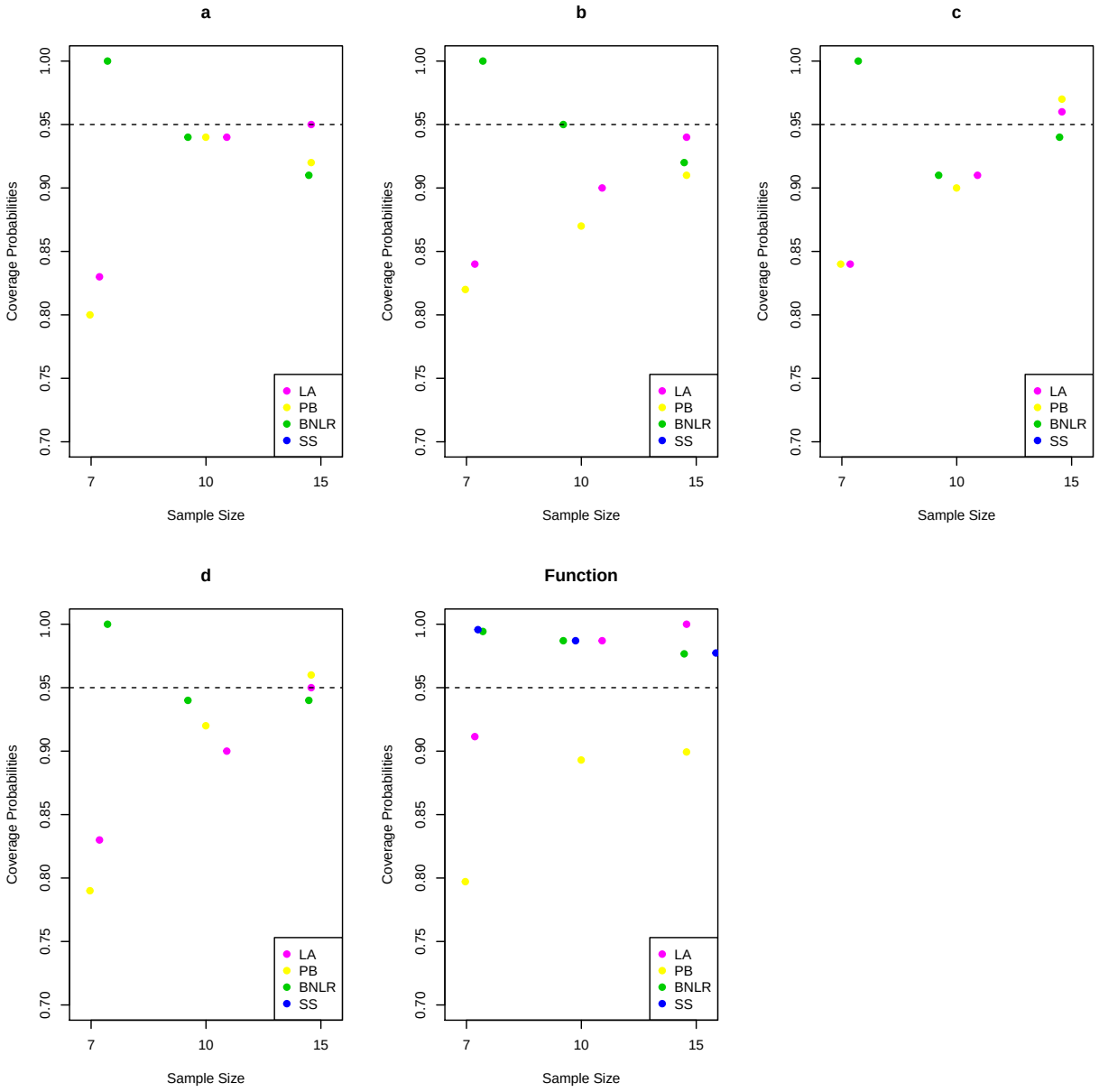

Figure 2: Coverage probabilities for the interval estimates by four non linear regression methods. 95% confidence/credible intervals were estimated for each of the parameters and the regression line at each of the design points. Coverage probabilities were estimated by monte carlo simulation (100 replicates). A dashed line shows the nominal 95% confidence level for each of methods. (red) LS linear approximation confidence interval. (blue) LS parametric bootstrap confidence interval. (purple) Bayesian non linear regression credible interval. (yellow) Smoothing spline credible interval.

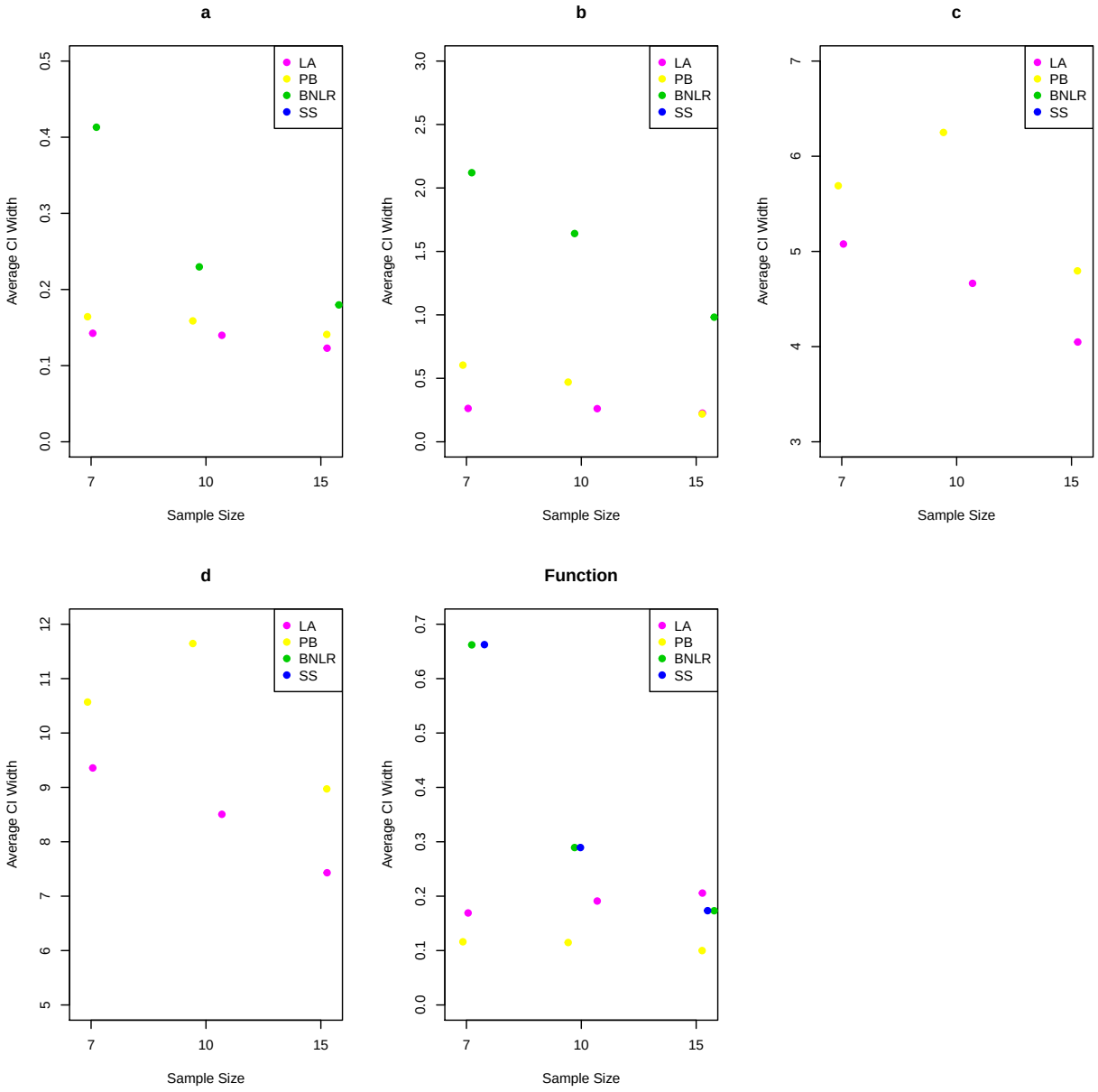

Figure 3: Coverage probabilities for the interval estimates by four non linear regression methods. 95% confidence/credible intervals were estimated for each of the parameters and the regression line at each of the design points. Coverage probabilities were estimated by monte carlo simulation (100 replicates). A dashed line shows the nominal 95% confidence level for each of methods. (red) LS linear approximation confidence interval. (blue) LS parametric bootstrap confidence interval. (purple) Bayesian non linear regression credible interval. (yellow) Smoothing spline credible interval.