

Supplementary Material for Bayesian Likelihood Free Inference using Mixtures of Experts

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We provide additional details and plots to complement the ones in the main body.

1 Numerical experiments

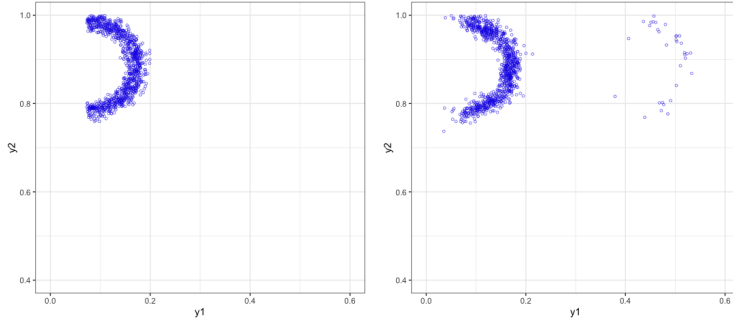


Figure 1: Two moons example: (a) sample from the 2 moons simulator, (b) sample from the GLLiM likelihood estimation with $K = 49$ Gaussian components, 1000 simulations each for $\theta = (-0.5, 0.75)$.

Exp.	Procedure	MCMC	L	D	K	N/m	BIC	GLLiM	$3 * 10^5$ ite	Package(s)
2 Moons	GLLiM BSL	RW MH	2	2	49	10^5	1h 28min	3min 6s	12min 30s	xLLiM, mcmc
	GLLiM post	-	2	2	49	10^5	1h 28min	3min 6s	-	xLLiM
	BSL	RW MH	2	2	-	500	-	-	23min 39s	BSL
	semiBSL	RW MH	2	2	-	500	-	-	33min 40s	BSL
	missBSLmean	RW MH	2	2	-	500	-	-	30min 21s	BSL
	missBSLvar	RW MH	2	2	-	500	-	-	29min 14s	BSL
Hyperb.	GLLiM BSL	RW MH	2	10	38	10^5	1h 43min	4min 47s	43min 20s	xLLiM, mcmc
	GLLiM BSL	SS	2	10	38	10^5	1h 43min	4min 47s	2h 35min	xLLiM, diversif
	GLLiM BSL	G MH	2	10	38	10^5	1h 43min	4min 47s	46min 28s	xLLiM
	GLLiM post	-	2	10	38	10^5	1h 43min	4min 47s	-	xLLiM
	BSL	RW MH	2	10	-	500	-	-	4h 19min	BSL, mcmc
	semiBSL	RW MH	2	10	-	500	-	-	4h 49min	BSL, mcmc
	missBSLmean	RW MH	2	10	-	500	-	-	4h 49min	BSL, mcmc
	missBSLvar	RW MH	2	10	-	500	-	-	4h 34min	BSL, mcmc
	uBSL	RW MH	2	10	-	500	-	-	4h 10min	BSL, mcmc

Table 1: Computation times for the main experiments and procedures. N is the number of samples used to learn a GLLiM model and m is the number of simulations at each iteration in the BSL procedures. The BIC column indicates the time spent in learning all GLLiM models between $K = 2$ and some K_{\max} while the GLLiM column shows the time for the selected K indicated under column K . The procedures times are indicated for $3 * 10^5$ MCMC iterations in the one before last column. Different CRAN packages are used as indicated in the last column.

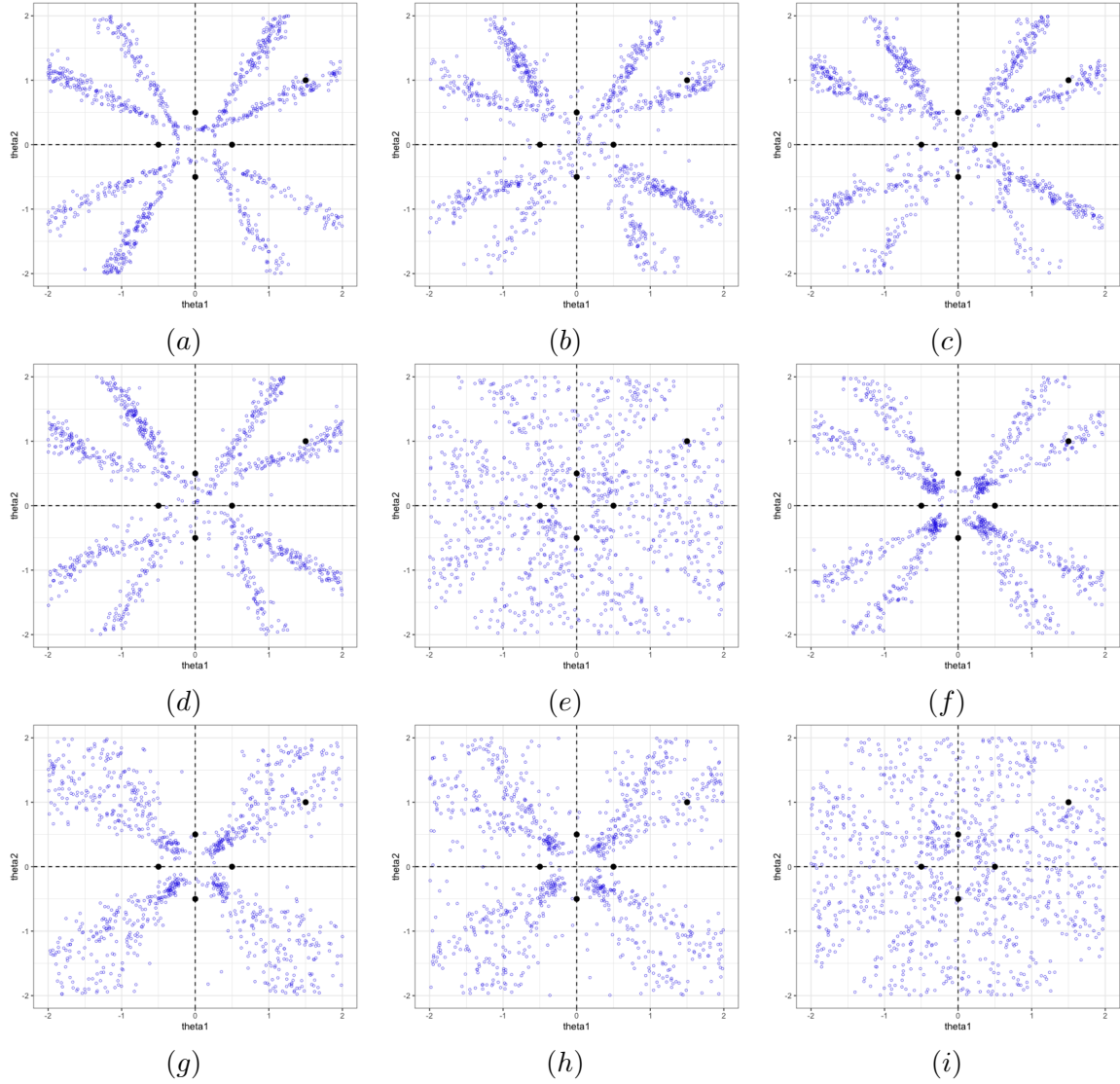


Figure 2: Hyperboloid example. Plot (a): reference Metropolis Hastings (RW MH) sample. (b,c,d): GLLiM posterior, GLLiM-BSL (RW MH and G MH) samples for $K = 38$. Plots (e) to (i): BSL variants with RW MH, respectively BSL, semiBSL, missBSLmean, missBSLvar, uBSL.

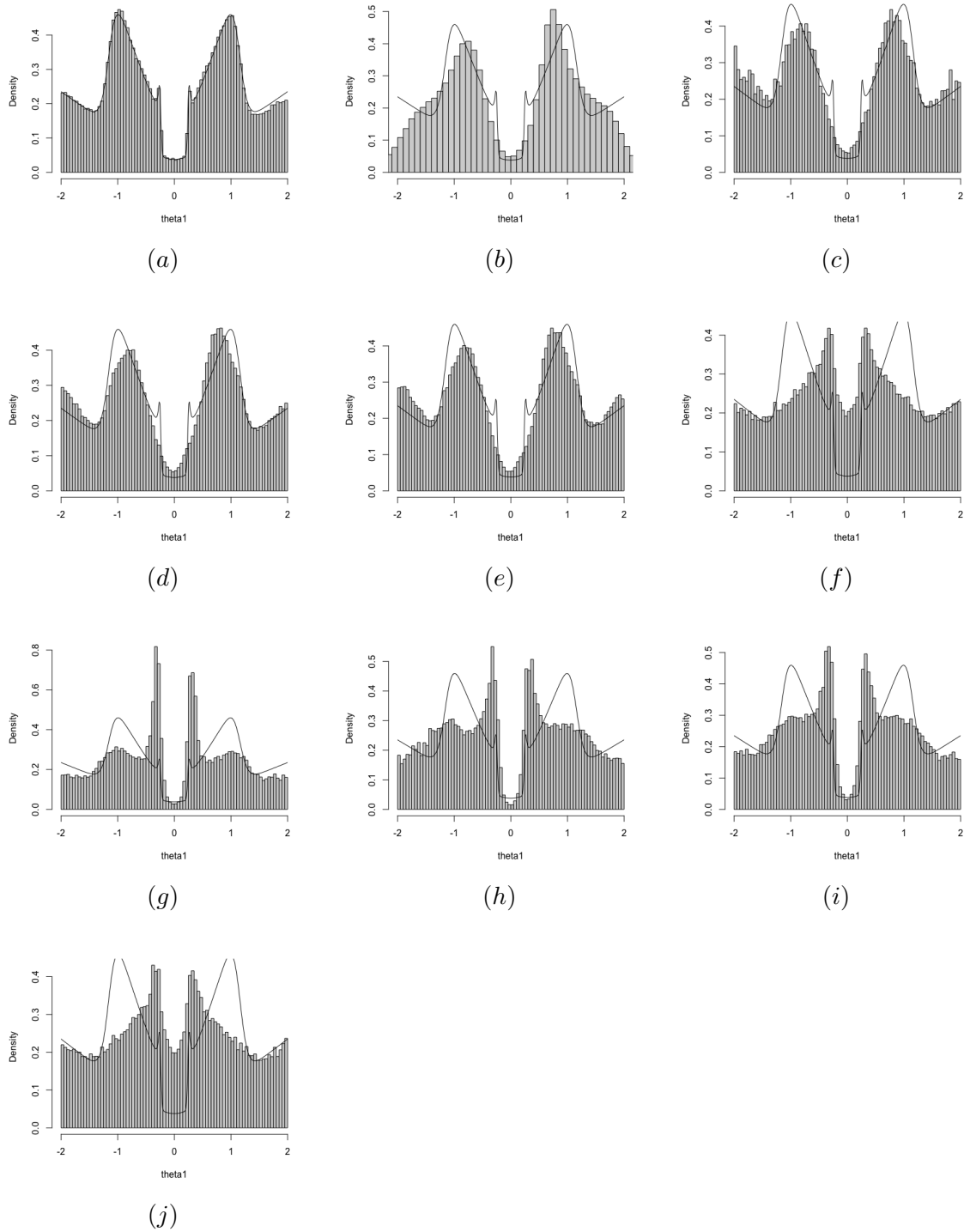


Figure 3: Hyperboloid example first posterior marginals. Plot (a): true posterior marginal and slice sampler (SS) sequence histogram. (b) GLLiM posterior $K = 38$. (c,d,e): GLLiM-BSL resp. with RW MH, SS and GLLiM posterior proposal (G MH). Plots (f) to (j): BSL variants, respectively BSL, semiBSL, missBSLmean, missBSLvar, uBSL.