

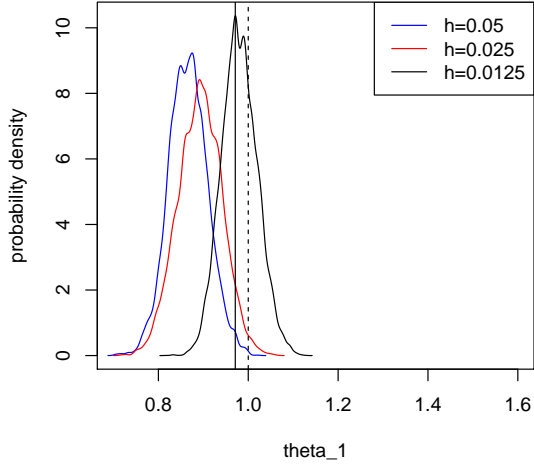
## POMP results

Table 1: pomp table

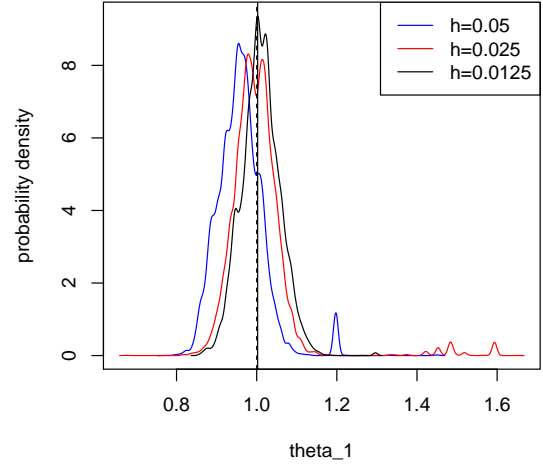
POMP dt	Mean	Std Dev	AR Rate
by2	0.959	0.058	10.99
	0.808	0.123	
	4.014	0.076	
by4	1.003	0.083	16.41
	0.953	0.125	
	3.991	0.367	
by8	1.009	0.047	17.13
	1.012	0.098	
	4.022	0.087	

Table 2: Comparing results of pomp and dtq

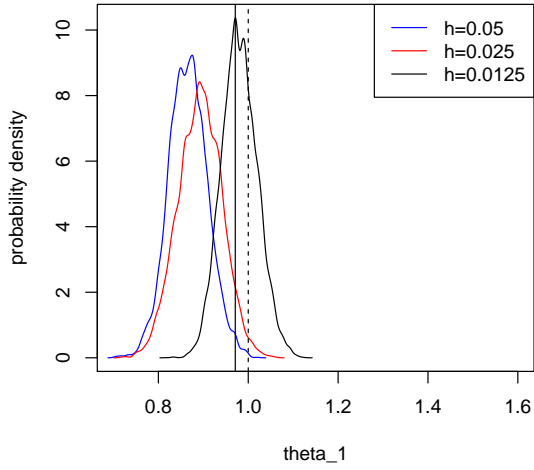
		Mean			RMS error	Std Dev			Accept rate (%)
		$\theta_1$	$\theta_2$	$\theta_3$		$\theta_1$	$\theta_2$	$\theta_3$	
h = 0.1	Eulerian	0.747	0.906	3.072	0.557	0.062	0.076	0.031	29.55
h = 0.05	pomp	0.960	0.809	4.014	0.113	0.058	0.123	0.076	10.99
	dtq	0.866	1.305	4.260	0.244	0.043	0.082	0.092	28.53
h = 0.025	pomp	1.004	0.954	3.992	0.027	0.083	0.125	0.367	16.41
	dtq	0.892	1.157	4.430	0.271	0.048	0.069	0.037	25.43
h = 0.0125	pomp	1.01	1.01	4.02	0.015	0.048	0.098	0.087	17.14
	dtq	0.98	1.17	4.21	0.155	0.039	0.077	0.035	23.87



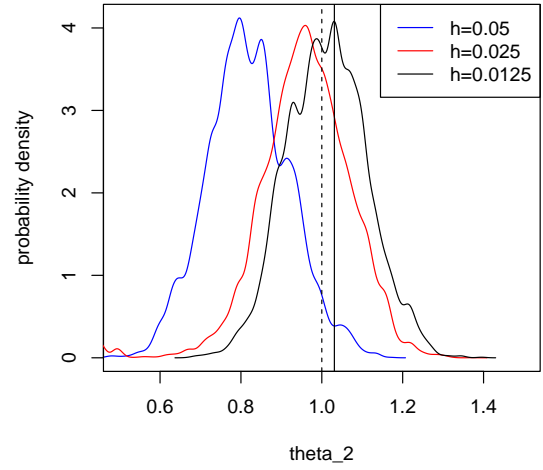
(a)  $\theta_1$  for DTQ



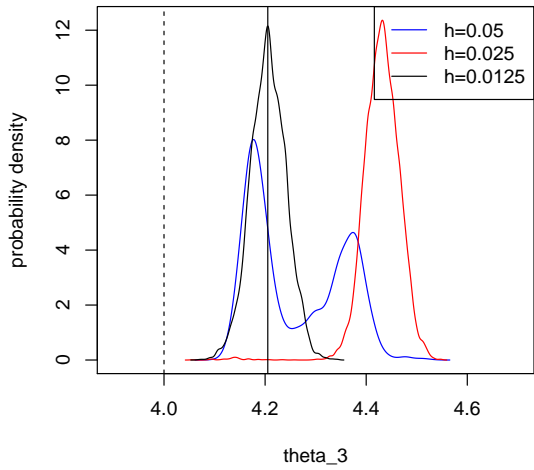
(b)  $\theta_1$  for POMP



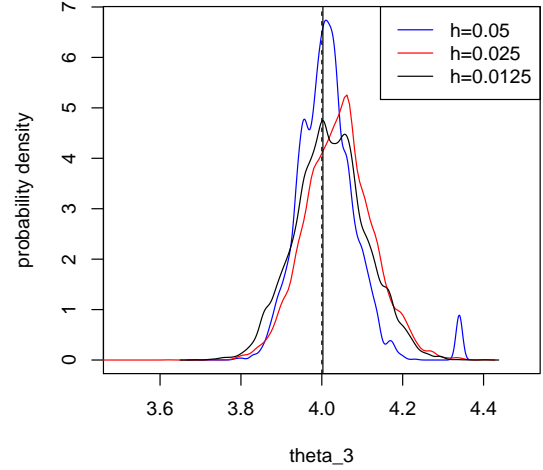
(c)  $\theta_2$  for DTQ



(d)  $\theta_2$  for POMP

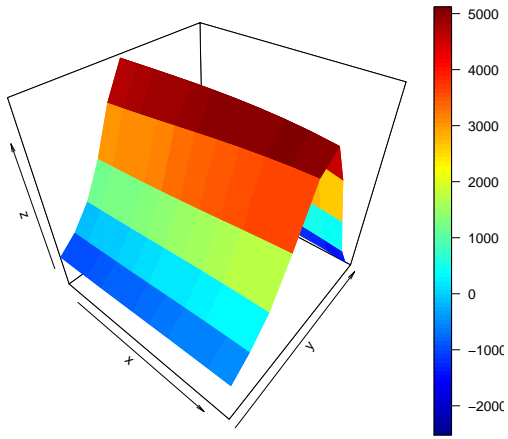


(e)  $\theta_3$  for DTQ

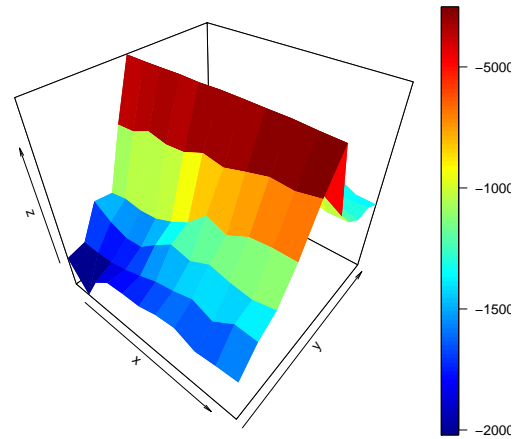


(f)  $\theta_3$  for POMP

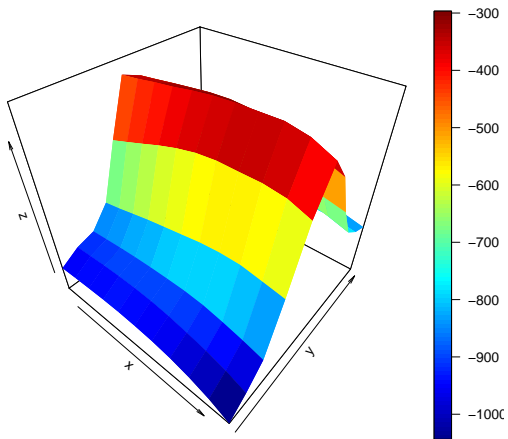
Figure1: Probability density comparison plots for DTQ and POMP for varying time steps ( $h = 0.05, 0.025, 0.0125$ ).



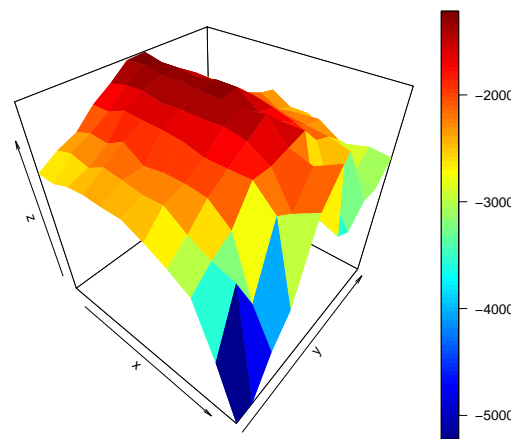
(a) DTQ by 100, by 2



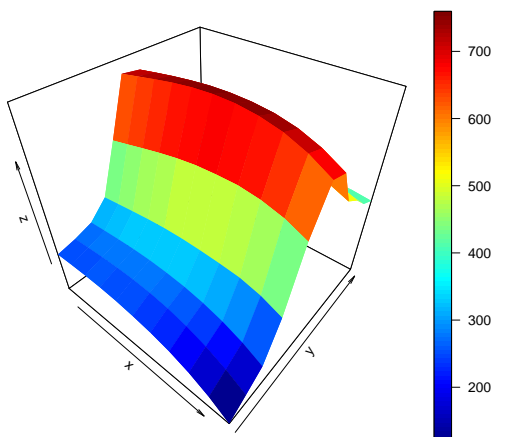
(b) POMP by 100, by 2



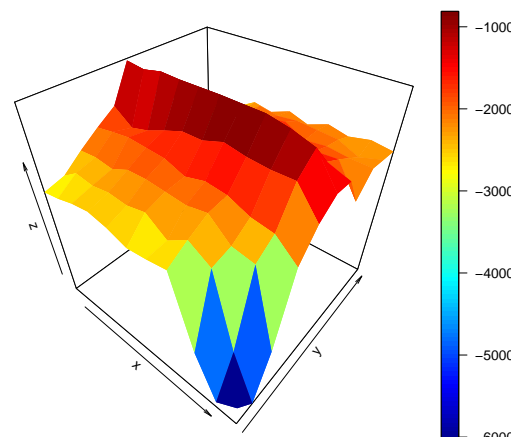
(c) DTQ by 100, by 2



(d) POMP by 100, by 2



(e) DTQ by 100, by 16



(f) POMP by 100, by 16

Figure 2: Likelihood surfaces for DTQ and POMP on the  $\theta_2$  and  $\theta_3$  grid

TODO: Change this table with new MCMC code for POMP MCMC steps = 2000, burnin steps = 100, measurement noise in  $X_1$  and  $X_2 = 10^{-2}$

N particles	Min	1st Quad	Median	Mean	3rd Quad	Max	Time	Accept %
10	5.835	6.386	6.386	6.522	6.386	7.550	37.124 + 3.032	0.0025%
50	5.440	5.440	5.811	5.800	6.032	6.955	44.392 + 3.144	0.0045%
100	5.309	5.499	5.617	5.741	5.925	6.785	44.736 + 3.024	0.006 %
200	5.345	5.476	5.971	5.856	6.086	9.950	58.696 + 2.852	0.006%
500	5.366	5.792	5.832	5.961	6.209	7.040	108.572 + 3.504	0.035%

Table 3: POMP table of difference in means

Difference Means	by 20	by 50	by 100	by 200
h by 1	-0.05734111	-0.06312163	0.02901005	-0.2683111
h by 2	-0.05791024	-0.1276239	-0.373554	1.45994
h by 3	-0.06203916	-0.0417083	-0.2357552	-0.1545804
h by 4	-0.08281177	-0.06374529	-0.2214498	-0.4768346
h by 5	-0.0573322	-0.05410928	-0.02877429	-0.1938626
h by 6			-0.06761619	-0.1046286
h by 7			-0.1818962	-0.03347735
h by 8			-0.05246908	-0.2339528
h by 9			-0.2730433	-0.1301727
h by 10			-0.02879612	-0.06420363

Table 4: Rdtq2d - Table of difference in means

Difference Means	by 20	by 50	by 100	by 200
h by 1	0.01799522		0.005835387	0.01591087
h by 2	-0.01703062		-0.0628411	-0.09772604
h by 3	0.01168039		-0.1564589	-0.1512427
h by 4			-0.086696	-0.1503922
h by 5			-0.09061449	-0.166959
h by 6			-0.05866944	-0.1651696
h by 7			-0.05619288	-0.1609761
h by 8			-0.06385678	-0.1642348
h by 9			-0.05940936	
h by 10			-0.09577861	

Table 5: POMP table of difference in modes

Difference Modes	by 20	by 50	by 100	by 200
h by 1	-0.0341092	-0.03675144	0.04459498	-0.2870469
h by 2	-0.04497344	-0.02220465	-0.01485807	2.482868
h by 3	-0.05712774	-0.05975342	-0.03467599	-0.005828138
h by 4	-0.06649671	-0.03845302	-0.03029839	-0.02734288
h by 5	-0.04263887	-0.04431851	-0.06616269	-0.01583606
h by 6			-0.04524299	0.02920972
h by 7			-0.03962572	-0.03218948
h by 8			-0.02710177	-0.01554538
h by 9			-0.04130269	-0.0286791
h by 10			-0.03013301	-0.0237121

Table 6: Rdtq2d - Table of difference in modes

Difference Modes	by 20	by 50	by 100	by 200
h by 1	0.007259653		-0.01422478	0.1906643
h by 2	0.0115566		0.02536292	0.0475644
h by 3	-0.01422478		-0.02010194	0.01216831
h by 4			-0.04844341	-0.03950003
h by 5			-0.05278264	-0.02550886
h by 6			-0.04495679	-0.02835948
h by 7			-0.04133994	-0.01596862
h by 8			-0.04112844	-0.02292278
h by 9			-0.03928337	
h by 10			-0.03531033	

Table 7: POMP table for acceptance ratios

Acceptance Ratio	by 20	by 50	by 100	by 200
by 1	24.4	16.6	1.1	21.5
by 2		19.7	46.6	41.1
by 3		22.8	40	26
by 4		15.5	36.9	55.7
by 5		22.6	25.2	30.9

Table 8: Rdtq2d table for acceptance ratio

Acceptance Ratio	by 20	by 50	by 100	by 200
by 1	28.5	33	37.6	52.9
by 2	29.9	32	36.8	53.1
by 3		32	47	52.5
by 4			37.7	51
by 5			37	50.3

Table 9: POMP table for time elapsed

Elapsed time	by 20	by 50	by 100	by 200
by 1	95.541	42.380	24.946	16.118
by 2		51.438	29.227	18.568
by 3		60.414	33.762	20.685
by 4		69.396	38.322	22.941
by 5		78.251	42.895	25.025

Table 10: Rdtq2d table for time elapsed

Elapsed time	by 20	by 50	by 100	by 200
by 1	0.143	0.151	0.143	0.138
by 2	17.174	1.949	0.571	0.305
by 3		67.011	12.370	3.073
by 4			36.988	8.698
by 5			98.264	17.898