Knot Spacing and Bandwidth Sim

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Small-scale simulation study on knots and bandwidth

We tried two different true knot spacings in this simulation study. The first spacing sets knots on a 20×20 grid in $[0,1] \times [0,1]$. The second spacing sets knots on a 10×10 grid in $[0,1] \times [0,1]$. We used three different data generation settings.

1. $\rho = 0.01$ and $\pi = 0.01$ with $n_s = 2000$ sites.
2. $\rho = 0.01$ and $\pi = 0.05$ with $n_s = 1000$ sites.
3. $\rho = 0.02$ and $\pi = 0.05$ with $n_s = 1000$ sites.

These all set ρ to be the knot spacing used in fitting the GEV which is a 12×12 grid.

Setting 1: $\rho = 0.01$ and $\pi = 0.01$ with $n_s = 2000$ sites.

Table 1: Results (x 100) for Knots: 20 x 20, $\rho = 0.01$, $\pi = 0.01$

	gev	log	pro
1	0.8169	0.7943	0.5434
2	0.3942	0.3978	0.3003
3	0.395	0.4021	0.1733
4	1.572	1.584	1.467
5	0.6053	0.5993	0.5551
6	0.7402	0.5868	0.4869
7	0.7078	0.4031	0.1996
8	0.9244	0.9901	0.4497
9	0.9582	0.99	0.6775
10	0.02199	0.01915	0.2385
Mean	0.7136	0.6767	0.5092

Table 2: Results (x 100) for Knots: 10 x 10, $\rho = 0.01$, $\pi = 0.01$

	gev	log	pro
1	1.04	0.9867	0.9219
2	1.103	1.186	0.9529
3	0.7178	0.7352	0.9585
4	0.2137	0.1602	0.1837
5	0.5744	0.99	0.3817
6	0.8611	0.99	0.81
7	0.9304	0.8974	0.699
8	0.9253	1.186	0.8368
9	0.3633	0.361	0.341
10	1.146	0.4713	0.3015
Mean	0.7876	0.7964	0.6387

Setting 2: $\rho = 0.01$ and $\pi = 0.05$ with $n_s = 1000$ sites.

Table 3: Results (x 100) for Knots: 20 x 20, $\rho = 0.01$, $\pi = 0.05$

	gev	log	pro
1	4.11	3.135	3.078

	gev	log	pro
2	5.155	4.788	4.367
3	4.693	4.306	4.361
4	4.482	4.608	4.517
5	3.856	3.857	3.05
6	4.522	4.115	3.464
7	4.421	4.296	4.495
8	6.014	6.404	5.512
9	4.925	4.92	4.717
10	4.1	3.63	3.679
Mean	4.628	4.406	4.124

Table 4: Results (x 100) for Knots: 10 x 10, $\rho = 0.01$, $\pi = 0.05$

	gev	log	pro
1	2.755	1.857	1.72
2	1.937	1.412	1.499
3	2.432	3.151	1.059
4	2.284	1.354	1.453
5	4.473	3.681	3.076
6	5.104	3.099	3.978
7	1.969	1.504	1.589
8	3.331	1.909	2.023
9	3.072	2.027	1.459
10	2.644	4.571	1.911
Mean	3	2.457	1.977

Setting 3: $\rho = 0.02$ and $\pi = 0.05$ with $n_s = 1000$ sites.

Table 5: Results (x 100) for Knots: 20 x 20, $\rho = 0.02$, $\pi = 0.05$

	gev	log	pro
1	4.305	3.376	2.87
2	4.718	3.846	3.149
3	5.299	4.085	3.873
4	3.494	3.705	3.594
5	2.792	3.502	2.362
6	4.218	3.22	1.843
7	3.71	3.904	4.475
8	5.21	6.035	4.373
9	3.157	3.315	3.176
10	4.028	3.307	3.233
Mean	4.093	3.83	3.295

Table 6: Results (x 100) for Knots: 10 x 10, $\rho = 0.02$, $\pi = 0.05$

	gev	log	pro
1	2.689	1.768	1.402
2	1.74	1.312	1.533
3	2.454	3.151	1.083
4	2.47	1.738	1.955
5	5.069	3.426	2.772
6	5.193	3.316	3.024
7	2.368	1.874	2.083
8	3.374	1.289	1.203
9	3.059	2.352	1.918
10	2.614	2.021	1.586
Mean	3.103	2.225	1.856

Next steps

Fit a few datasets with *rho* as a parameter in the MCMC.