

A comparison of three-dimensional rotation formalisms for least-squares and Bayesian inverse kinematics

Appendix C

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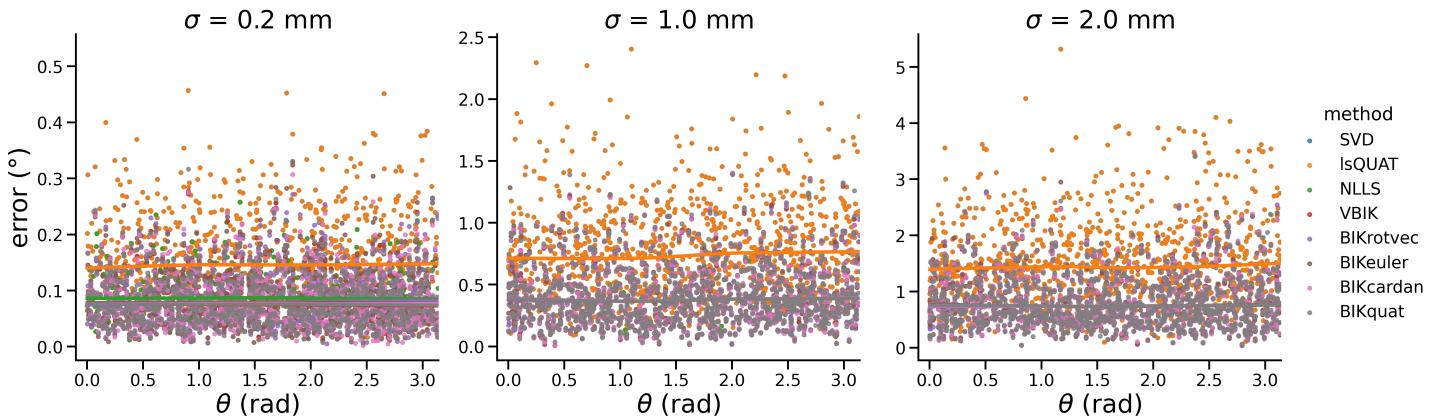


Figure 1: Scatter plots of inverse kinematics estimation errors versus rotation magnitude (θ). Note the different y-axis scales corresponding to different noise levels (σ). The lines are locally weighted scatter plot smoothers (LOESS) representing local averages.

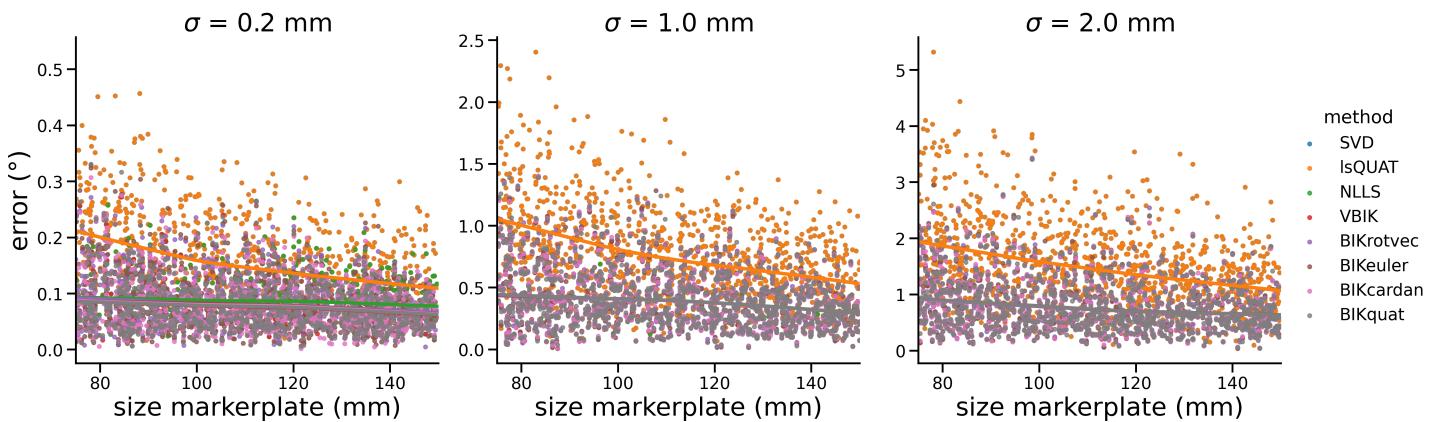


Figure 2: Scatter plots of inverse kinematics estimation errors versus size of the marker plate (size = x indicates a square marker plate of $x^2 \text{ mm}^2$). Note the different y-axis scales corresponding to different noise levels (σ). The lines are locally weighted scatter plot smoothers (LOESS) representing local averages.

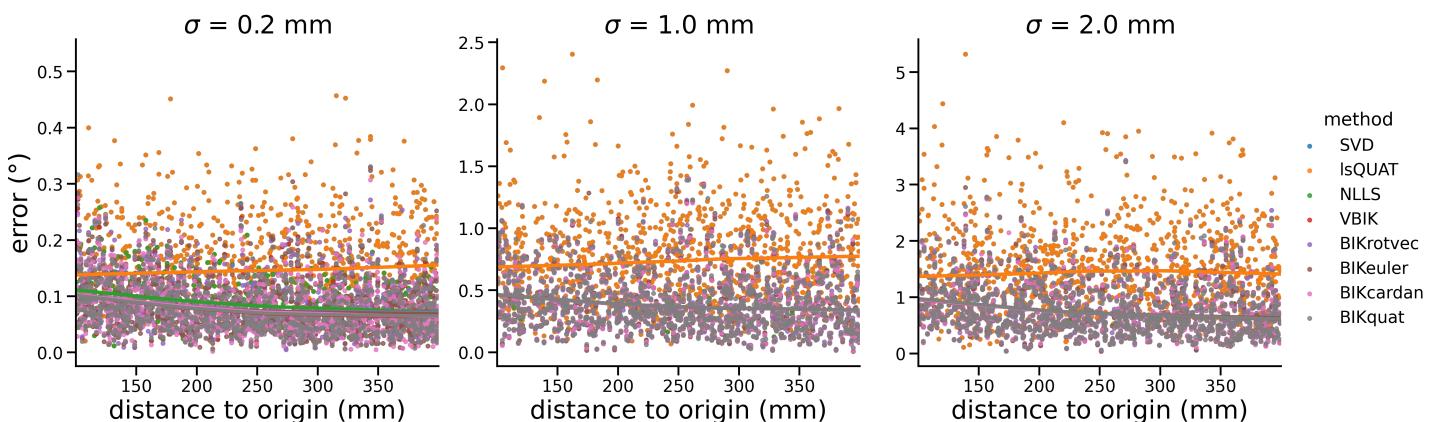


Figure 3: Scatter plots of inverse kinematics estimation errors versus distance of the marker plate centroid to the origin. Note the different y-axis scales corresponding to different noise levels (σ). The lines are locally weighted scatter plot smoothers (LOESS) representing local averages.

Table 1: Descriptive statistics of the IK errors (degrees)

noise σ (mm)	method	mean	SD	min	Q1	Q2	Q3	max
0.2	BIKcardan	0.083	0.045	0.002	0.050	0.074	0.105	0.307
	BIKeuler	0.085	0.046	0.008	0.051	0.077	0.108	0.324
	BIKquat	0.081	0.044	0.006	0.048	0.073	0.104	0.331
	BIKrotvec	0.086	0.045	0.005	0.054	0.077	0.107	0.276
	NLLS	0.091	0.045	0.007	0.057	0.085	0.117	0.329
	SVD	0.154	0.074	0.012	0.101	0.139	0.195	0.457
	VBIK	0.081	0.044	0.007	0.048	0.072	0.103	0.329
	lsQUAT	0.154	0.074	0.012	0.101	0.139	0.195	0.457
1.0	BIKcardan	0.409	0.229	0.010	0.245	0.364	0.526	1.400
	BIKeuler	0.410	0.231	0.007	0.246	0.366	0.524	1.402
	BIKquat	0.413	0.234	0.015	0.248	0.367	0.522	1.389
	BIKrotvec	0.409	0.230	0.011	0.243	0.364	0.525	1.390
	NLLS	0.409	0.228	0.007	0.244	0.364	0.524	1.398
	SVD	0.772	0.370	0.067	0.492	0.731	0.986	2.404
	VBIK	0.409	0.229	0.007	0.244	0.365	0.525	1.398
	lsQUAT	0.772	0.370	0.067	0.492	0.731	0.986	2.404
2.0	BIKcardan	0.809	0.457	0.042	0.479	0.700	1.057	3.414
	BIKeuler	0.813	0.456	0.037	0.487	0.701	1.061	3.415
	BIKquat	0.813	0.460	0.040	0.479	0.696	1.060	3.412
	BIKrotvec	0.807	0.455	0.047	0.478	0.689	1.055	3.432
	NLLS	0.807	0.454	0.047	0.480	0.699	1.054	3.410
	SVD	1.533	0.747	0.099	1.010	1.437	1.920	5.319
	VBIK	0.807	0.454	0.046	0.480	0.699	1.056	3.410
	lsQUAT	1.533	0.747	0.099	1.010	1.437	1.920	5.319