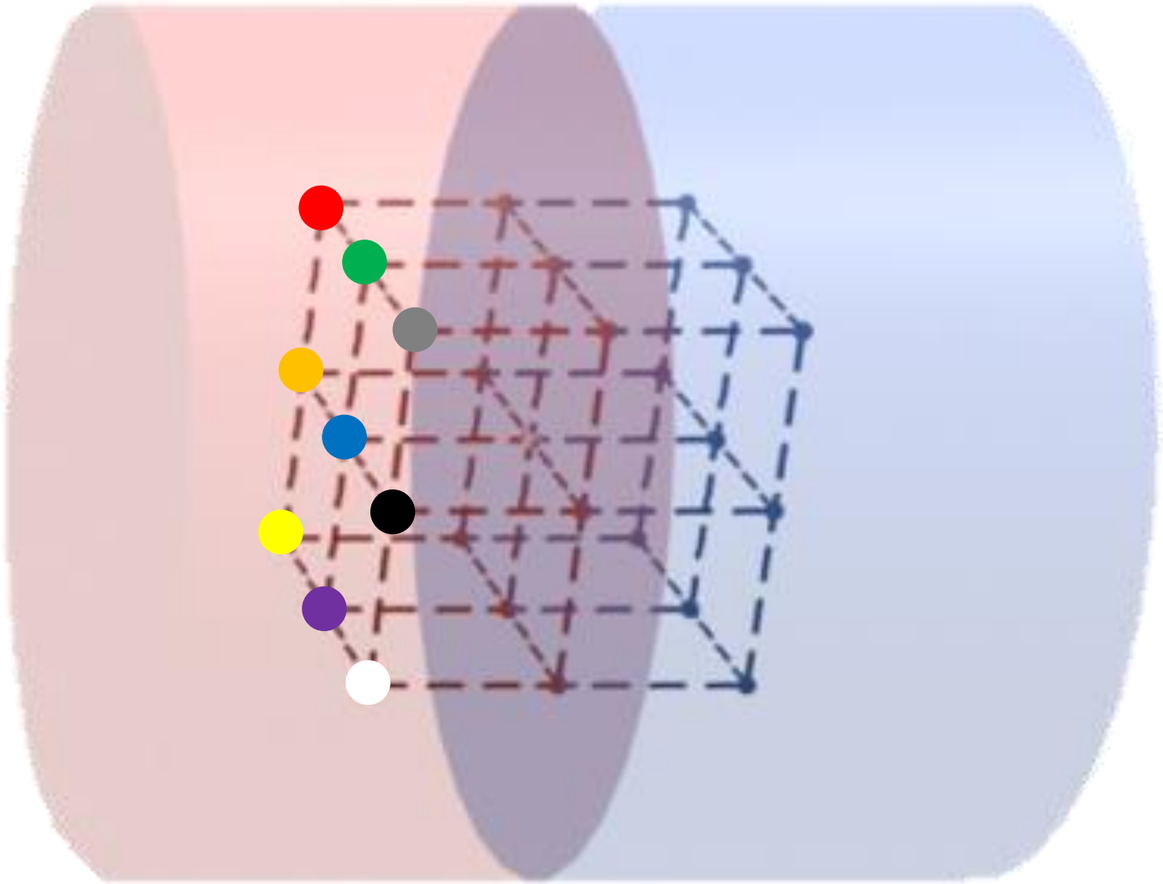
Parametric sweeps

TI Precision Labs – TI Magnetic Sense Simulator (TIMSS)

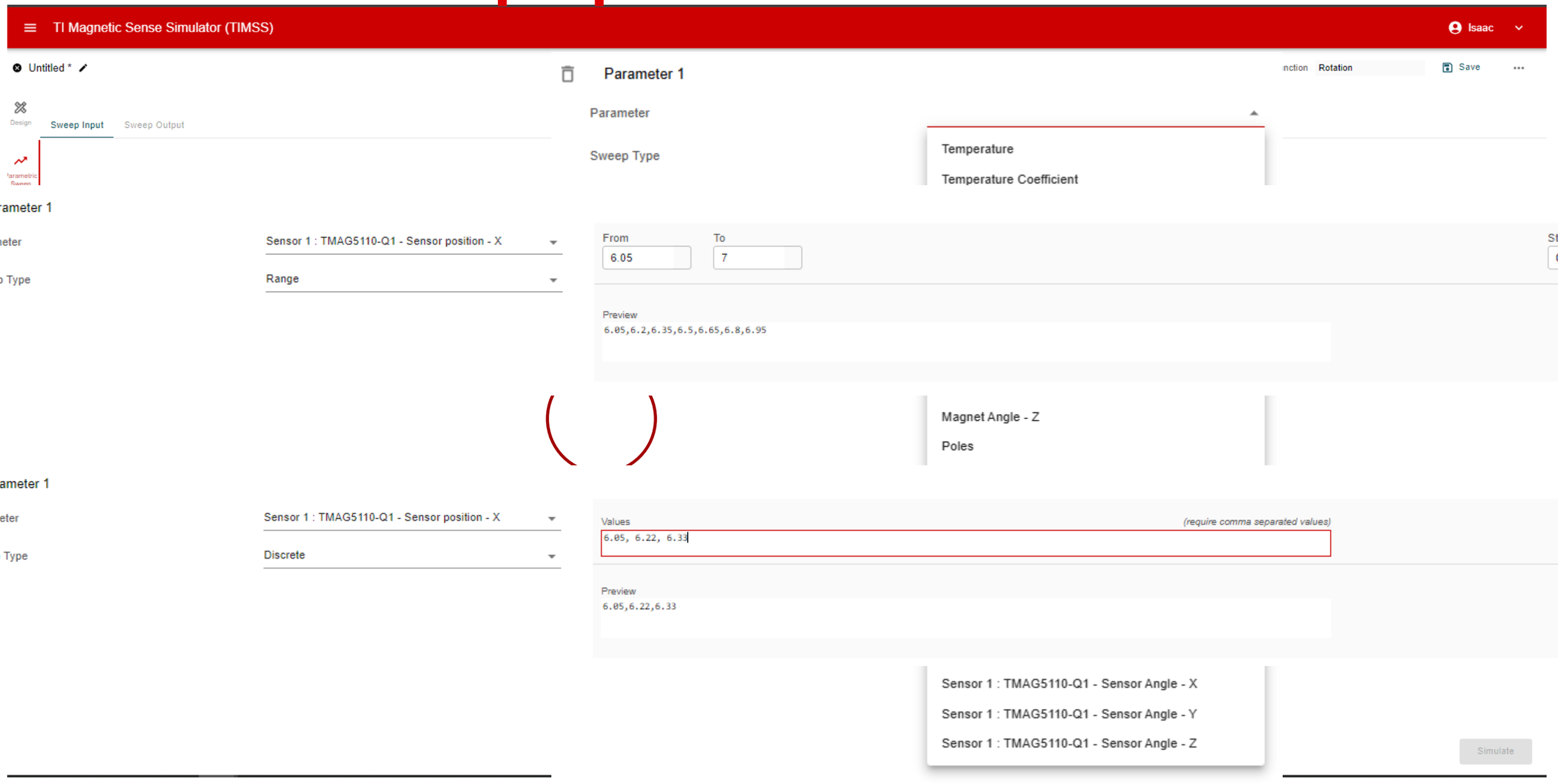
Presented and prepared by Isaac Lara

What are parametric sweeps?

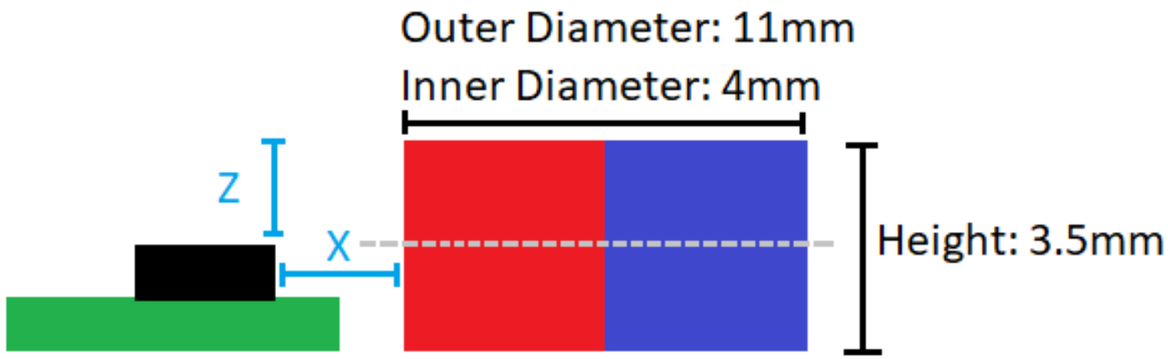


(0,0,0)
(0,1,0)
(0,2,0)
(1,0,0)
(1,1,0)
(1,2,0)
(2,0,0)
(2,1,0)
(2,2,0)
(X,Y,Z)

Parametric sweep options



Simulation configuration example

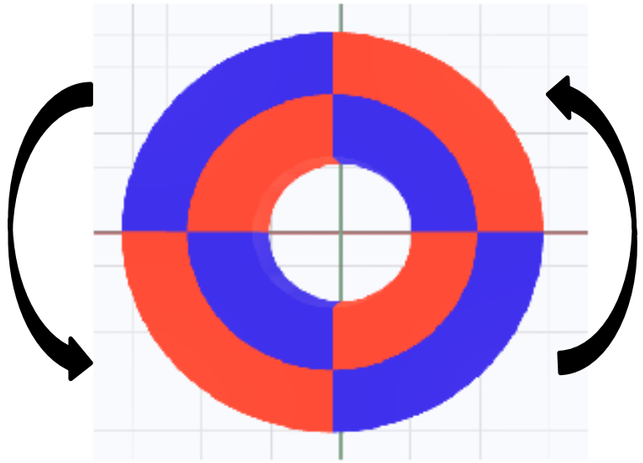


Sensor position:

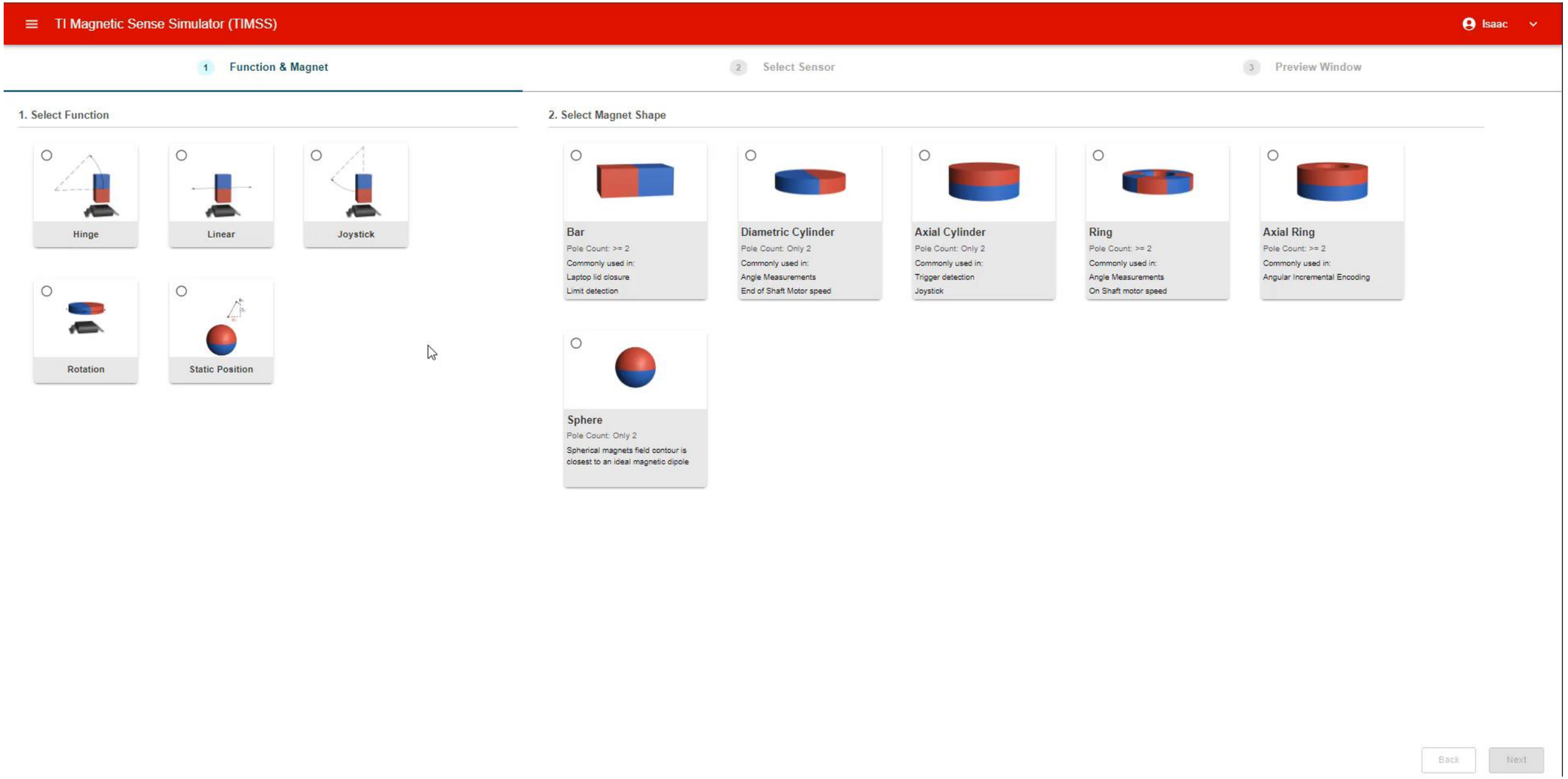
- X- 6.05mm
- Y- 0mm
- Z- 0.25mm

Other magnet details:

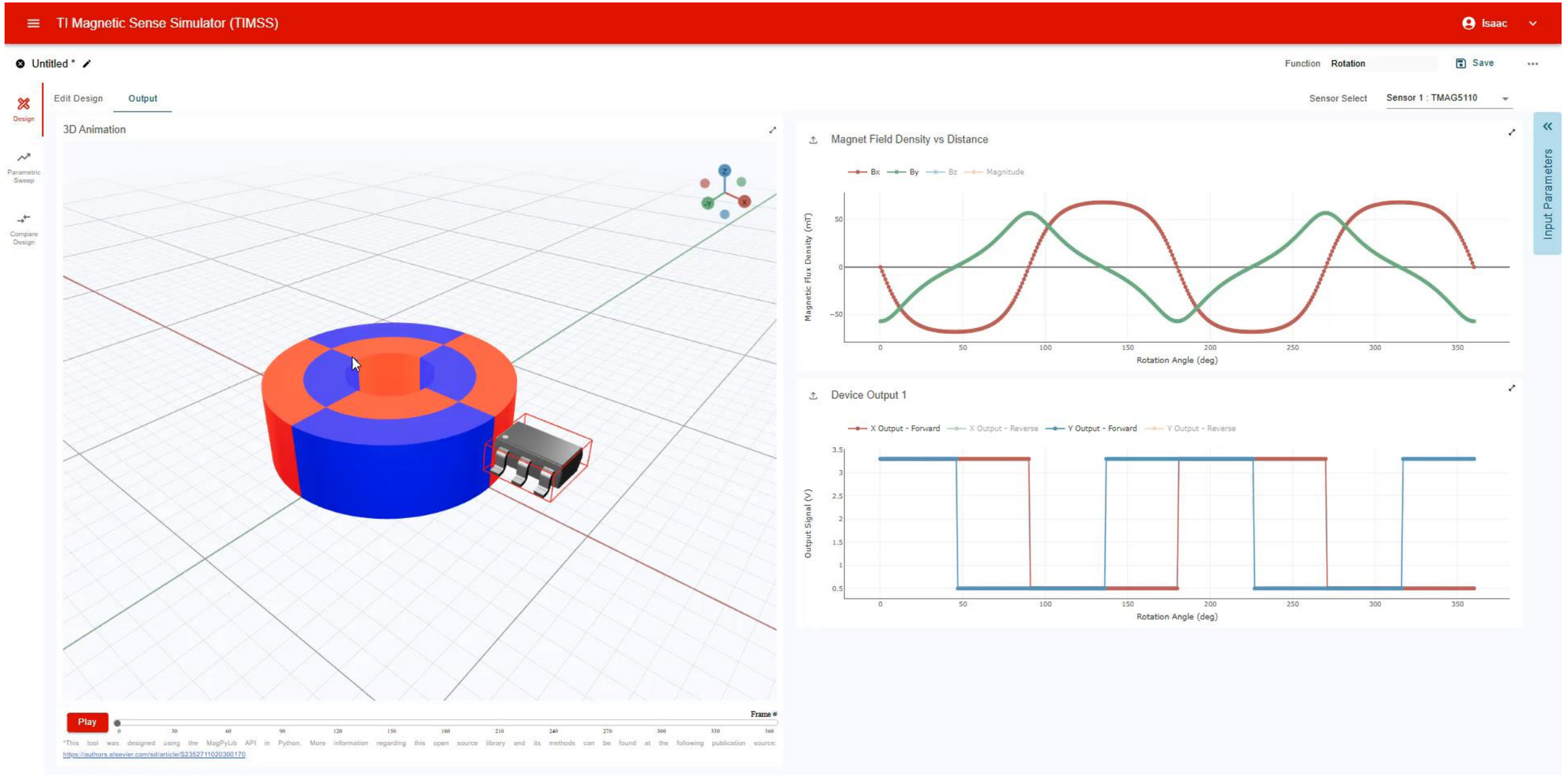
- Magnet Shape- Ring
- Pole count- 4
- Degrees of rotation- 360°
- Material- AlNiCo
- Magnet grade-LN9



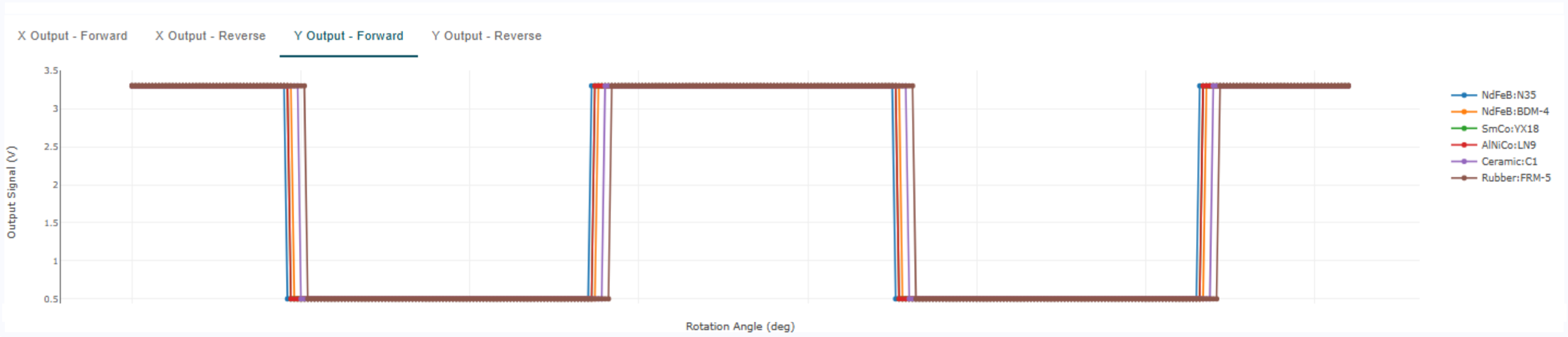
Simulation configuration walkthrough



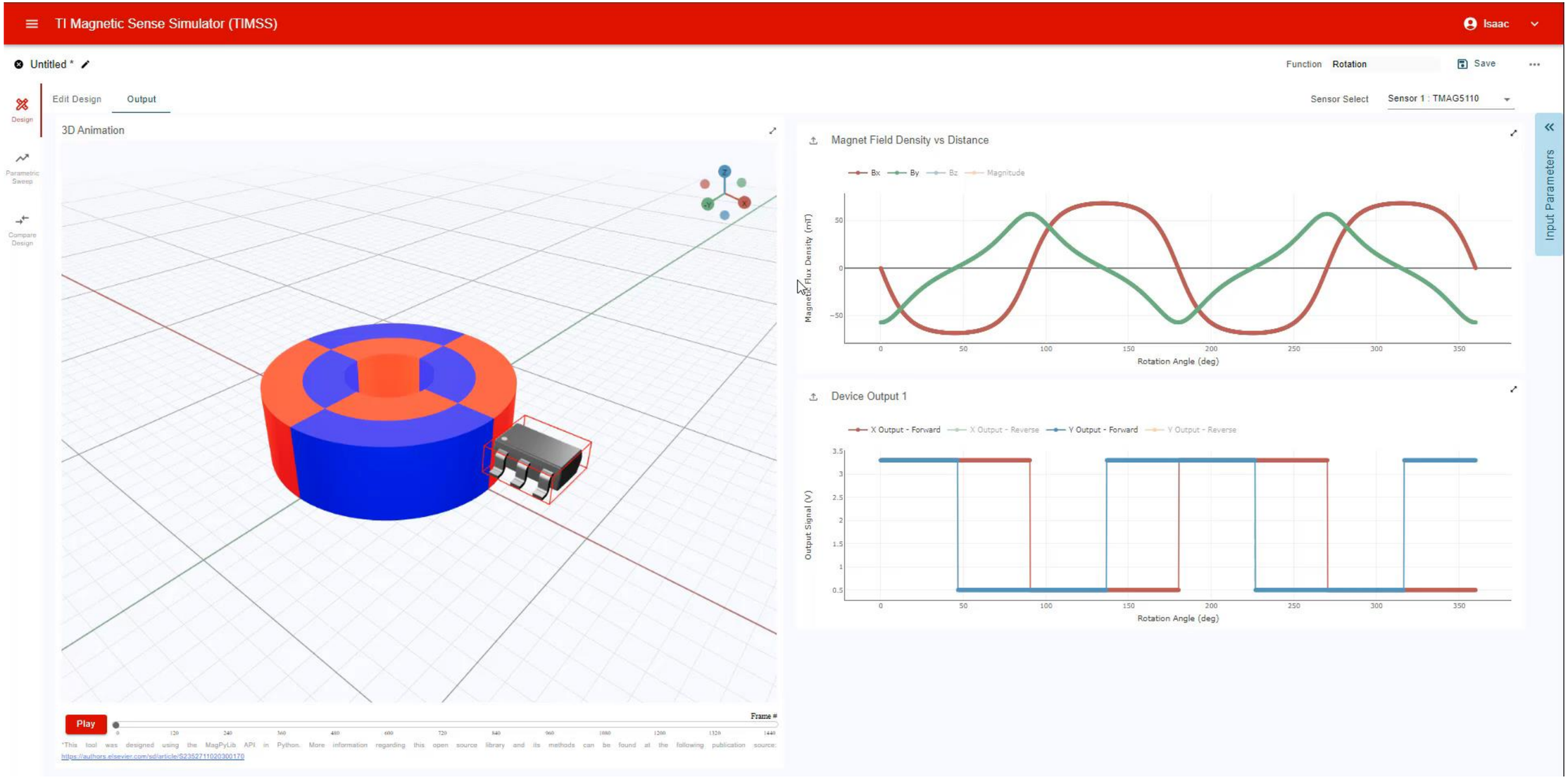
Single parametric sweep example



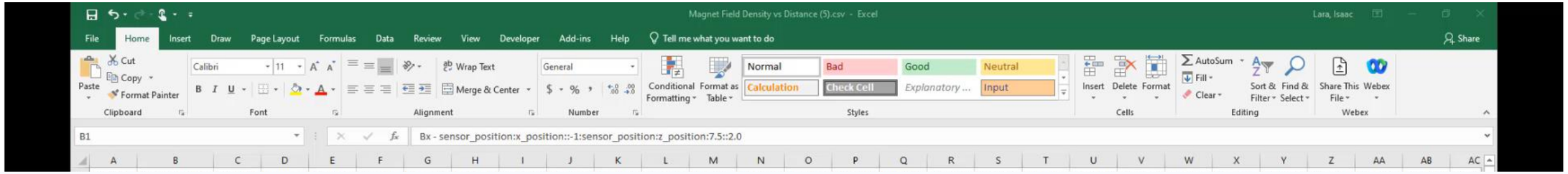
Results

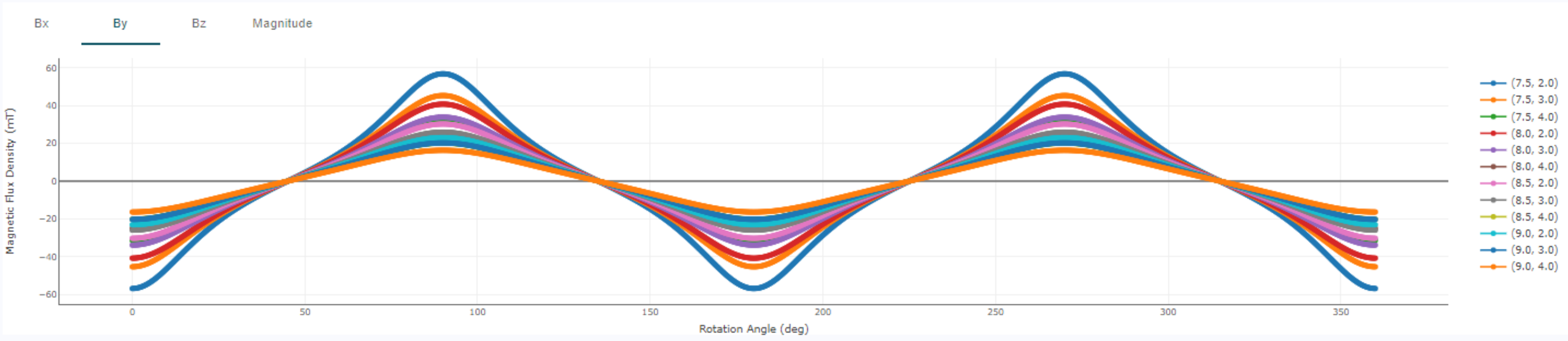

X Output - Forward
X Output - Reverse
Y Output - Forward
Y Output - Reverse
Output Signal (V)
3.5
3
2.5
2
1.5
1
0.5
Rotation Angle (deg)
NdFeB:N35
NdFeB:BDM-4
SmCo:YX18
AlNiCo:LN9
Ceramic:C1
Rubber:FRM-5

Combinational parametric sweep example



Results





29	6.75	-27.25746132	-18.2686	-8.49052	-18.5865	-13.3091	-7.27649	-13.2579	-10.0131	-6.1175	-9.78873	-7.71636	-5.11187	-51.5514	-41.5819	-29.2704	-37.7457	-31.5889	-23.6235	-28.3801	-24.4444	-19.1363	-21.8199	-19.2243	-15.5947	-6.59048	-11.9867	-11.0577	-4.24
30	7	-28.13725451	-18.8652	-8.77627	-19.2091	-13.7586	-7.52655	-13.7119	-10.358	-6.33056	-10.1288	-7.98557	-5.29155	-51.1894	-41.3228	-29.1265	-37.5334	-31.4274	-23.5219	-28.2458	-24.3372	-19.0626	-21.7298	-19.1496	-15.5399	-6.81128	-12.3884	-11.4355	-4.3
31	7.25	-29.00472163	-19.454	-9.05918	-19.8252	-14.2038	-7.77463	-14.1622	-10.7003	-6.54224	-10.4666	-8.25307	-5.47022	-50.8192	-41.0575	-28.9787	-37.3154	-31.2616	-23.4174	-28.1076	-24.2269	-18.9867	-21.637	-19.0726	-15.4833	-7.02979	-12.786	-11.8101	-4.53
32	7.5	-29.85970595	-20.0351	-9.3392	-20.4347	-14.6446	-8.02071	-14.6087	-11.0399	-6.75249	-10.802	-8.51882	-5.64787	-50.4412	-40.7861	-28.8271	-37.0921	-31.0914	-23.31	-27.9657	-24.1134	-18.9085	-21.5416	-18.9934	-15.425	-7.24596	-13.1793	-12.1814	-4.67
33	7.75	-30.70207148	-20.6083	-9.61628	-21.0375	-15.0808	-8.26472	-15.0513	-11.3768	-6.96129	-11.1349	-8.78277	-5.82446	-50.0557	-40.509	-28.6717	-36.8635	-30.9171	-23.1997	-27.8202	-23.997	-18.8282	-21.4436	-18.9119	-15.365	-7.45975	-13.5684	-12.5495	-4.82
34	8	-31.53170242	-21.1736	-9.89036	-21.6335	-15.5126	-8.50664	-15.4899	-11.7108	-7.16859	-11.4654	-9.04489	-5.99996	-49.6634	-40.2265	-28.5127	-36.63	-30.7387	-23.0867	-27.6711	-23.8776	-18.7457	-21.343	-18.8283	-15.3034	-7.67113	-13.9531	-12.9142	-4.96
35	8.25	-32.34850269	-21.7308	-10.1614	-22.2225	-15.9397	-8.74643	-15.9244	-12.042	-7.37437	-11.7934	-9.30512	-6.17436	-49.2644	-39.9387	-28.3503	-36.3916	-30.5565	-22.9709	-27.5185	-23.7554	-18.6611	-21.2399	-18.7425	-15.2401	-7.88005	-14.3334	-13.2754	-5.09
36	8.5	-33.15239529	-22.2799	-10.4294	-22.8045	-16.362	-8.98404	-16.3549	-12.3702	-7.5786	-12.1188	-9.56344	-6.34762	-48.8593	-39.6461	-28.1844	-36.1486	-30.3705	-22.8525	-27.3626	-23.6304	-18.5745	-21.1344	-18.6547	-15.1752	-8.08649	-14.7093	-13.6332	-5.23
37	8.75	-33.9433217	-22.8209	-10.6943	-23.3794	-16.7797	-9.21944	-16.7811	-12.6955	-7.78125	-12.4416	-9.81981	-6.51973	-48.4485	-39.3488	-28.0153	-35.9012	-30.181	-22.7315	-27.2035	-23.5027	-18.4859	-21.0264	-18.5648	-15.1088	-8.29042	-15.0807	-13.9874	-5.37
38	9	-34.72124117	-23.3537	-10.956	-23.9471	-17.1925	-9.45261	-17.2031	-13.0178	-7.98228	-12.7617	-10.0742	-6.69066	-48.0323	-39.047	-27.843	-35.6496	-29.9879	-22.608	-27.0412	-23.3723	-18.3953	-20.9162	-18.4729	-15.0408	-8.49182	-15.4475	-14.3381	-5.50

Learn more

- TI Magnetic Sense Simulator Product Folder
  https://www.ti.com/TIMSS
- TI Magnetic Sense Simulator User's Guide
  https://www.ti.com/lit/ug/slyu067/slyu067.pdf
- TI Magnetic Sense Simulator App Brief
  https://www.ti.com/lit/ab/slya083/slya083.pdf
- Position Sensing Demo Video Series
  https://www.ti.com/video/series/position-sensing-demos.html
- TI Precision Labs: Magnetic Sensor Training Videos
  https://www.ti.com/video/series/precision-labs/ti-precision-labs-magnetic-sensors.html
- Sensors E2E Forum
  https://e2e.ti.com/support/sensors-group/sensors/f/sensors-forum
- TI Magnetic Sensor Portfolio
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