

Chopper Tune vs TMC Autotune

Testing performed by
Frankramm

Presentation & subjective conclusion
by Reth

Chopper Tune

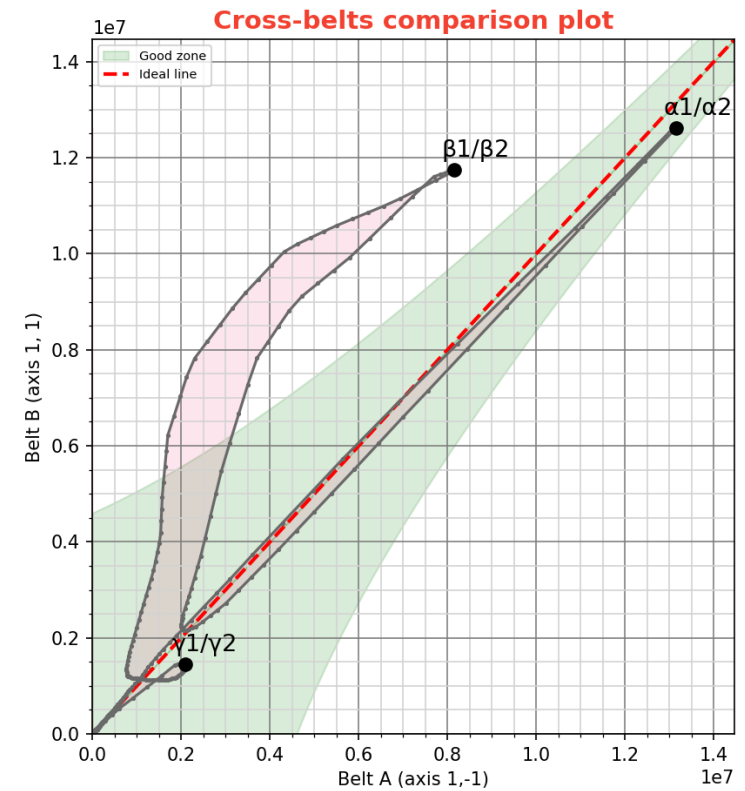
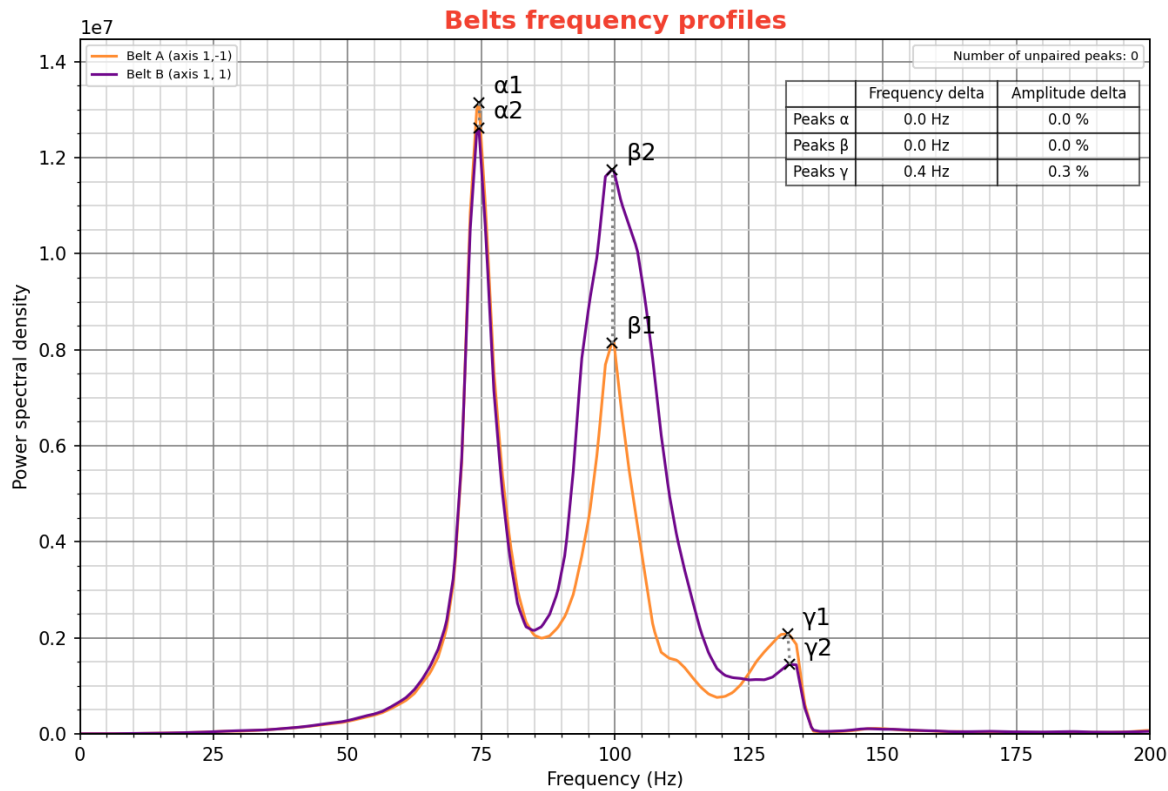


RELATIVE BELTS CALIBRATION TOOL

09/24/25 12:37:39 -- COREXY kinematics

| Mode: PULSE-ONLY -- ApH: 100.0
| Estimated similarity: 91.4%
| Good mechanical health (experimental)

v5.2.1



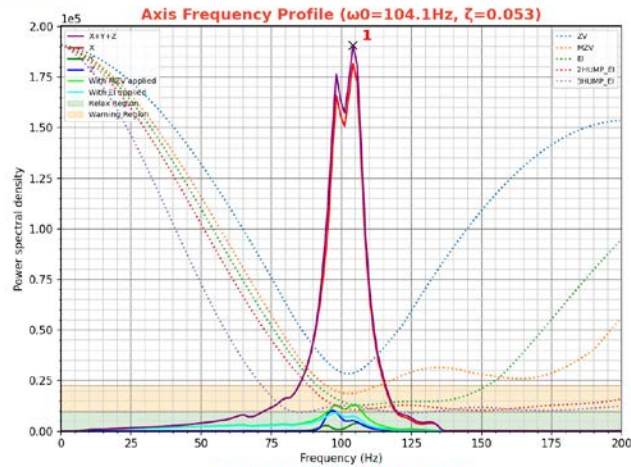
Chopper Tune



INPUT SHAPER CALIBRATION TOOL

09/24/25 12:43:58 -- X axis

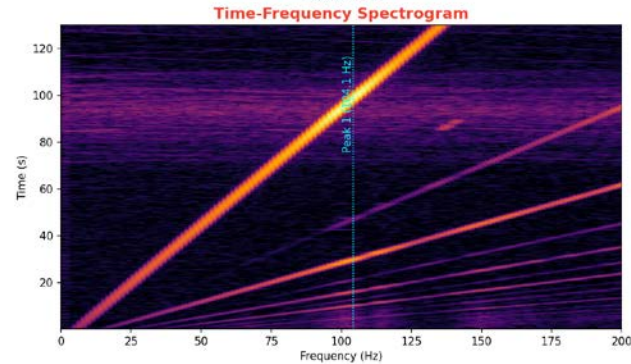
Mode: PULSE-ONLY -- ApH: 100.0
Square corner velocity: 5.0 mm/s
Allowed smoothing: default (=0.039)



Recommended filters:

- > For performance: MZV @ 101.6 Hz
- > For low vibrations: EI @ 121.8 Hz
- > Estimated damping ratio (ζ): 0.053

Type	Frequency	Vibrations	Smoothing	Max Accel
ZV	102.8 Hz	5.9 %	0.020	40750
MZV	101.6 Hz	1.0 %	0.022	30170
EI	121.8 Hz	0.0 %	0.024	27270
2HUMP_EI	149.8 Hz	0.0 %	0.028	24430
3HUMP_EI	149.8 Hz	0.0 %	0.039	15890

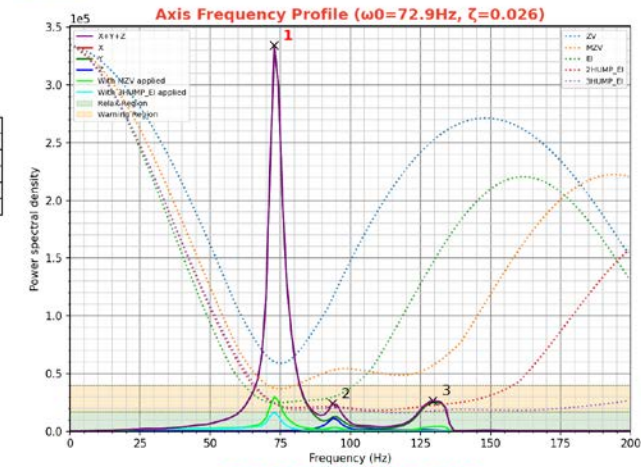


INPUT SHAPER CALIBRATION TOOL

09/24/25 12:46:56 -- Y axis

Mode: PULSE-ONLY -- ApH: 100.0
Square corner velocity: 5.0 mm/s
Allowed smoothing: default (=0.049)

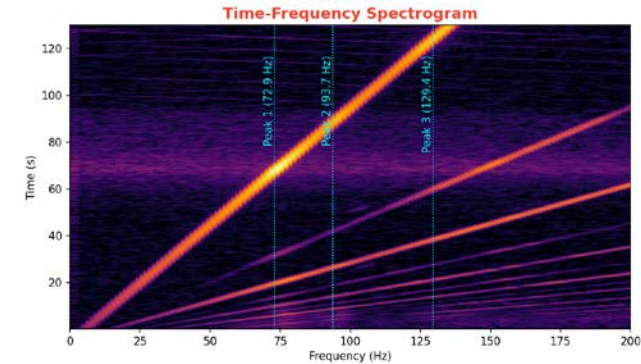
v5.2.1



Recommended filters:

- > For performance: MZV @ 73.8 Hz
- > For low vibrations: 3HUMP_EI @ 139.8 Hz
- > Estimated damping ratio (ζ): 0.026

Type	Frequency	Vibrations	Smoothing	Max Accel
ZV	75.4 Hz	7.1 %	0.032	21850
MZV	73.8 Hz	1.9 %	0.038	15860
EI	82.2 Hz	0.0 %	0.049	12370
2HUMP_EI	111.4 Hz	0.0 %	0.045	13430
3HUMP_EI	139.8 Hz	0.0 %	0.044	13760



Chopper Tune

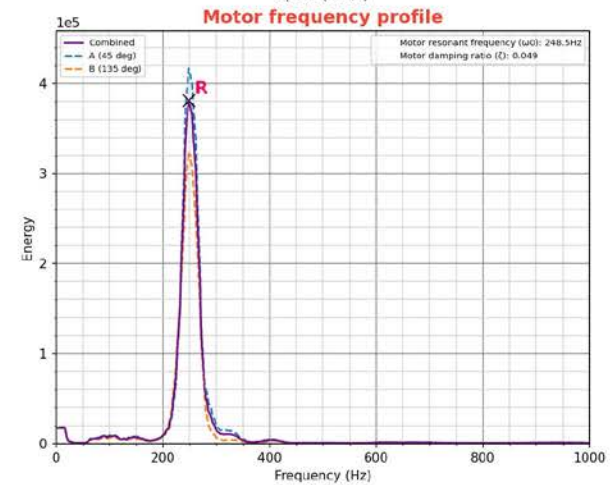
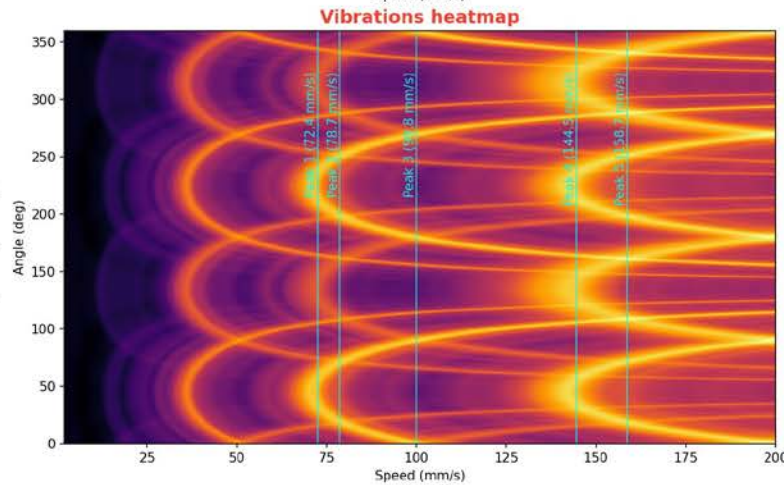
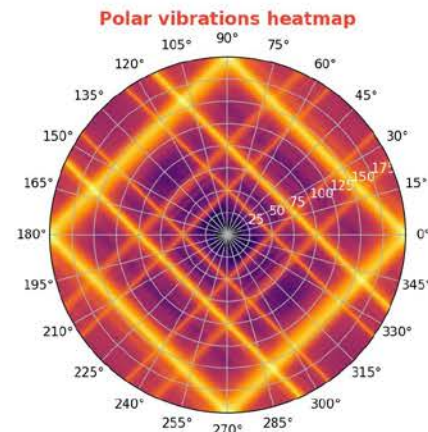
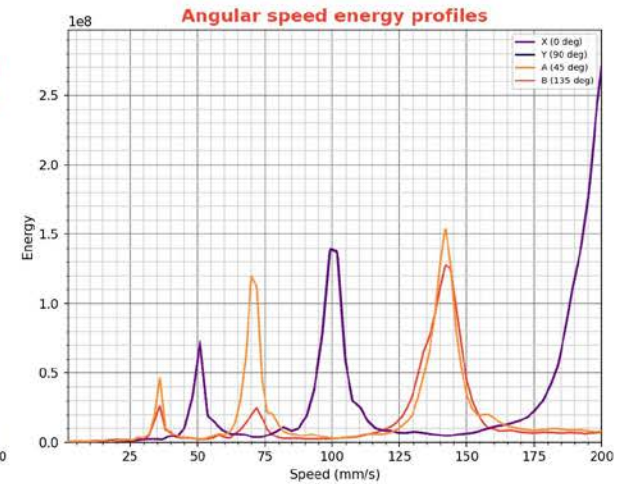
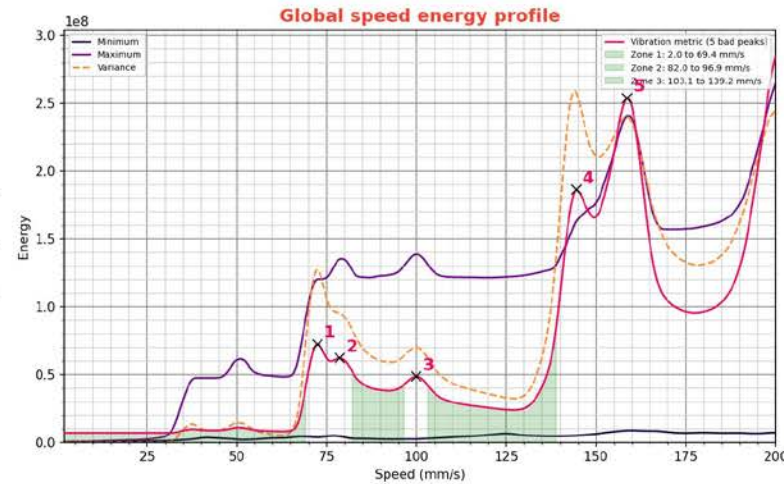
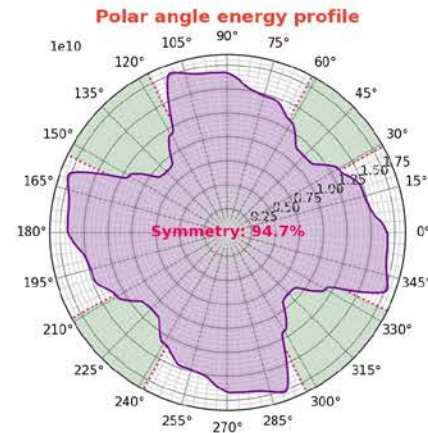


MACHINE VIBRATIONS ANALYSIS TOOL
09/24/25 12:50:28 at 3000 mm/s² -- COREXY kinematics

X motor: TMC5160 @ 1.50A - 32usteps
Y motor: TMC5160 @ 1.50A - 32usteps
TMC Autotune not detected

CHOPCONF: toff=1 hend=10 tpf=1 intpol=1 dedge=1
PWMCONF: ofs=30 autoscale=1 autograd=1 reg=4 lim=12
COOLCONF:
THRS: tpwmthrs=1048575

v5.2.1



TMC Autotune

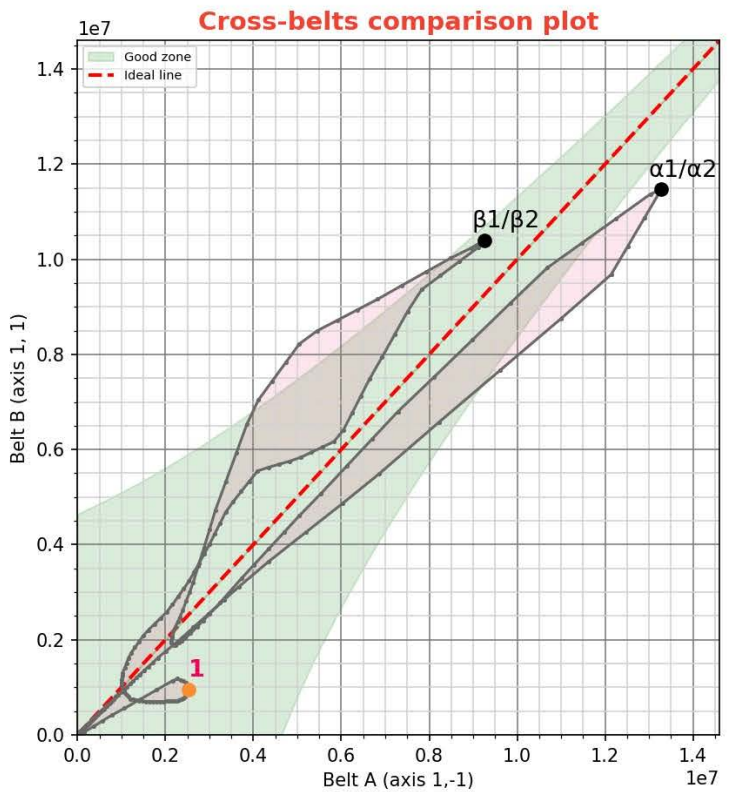
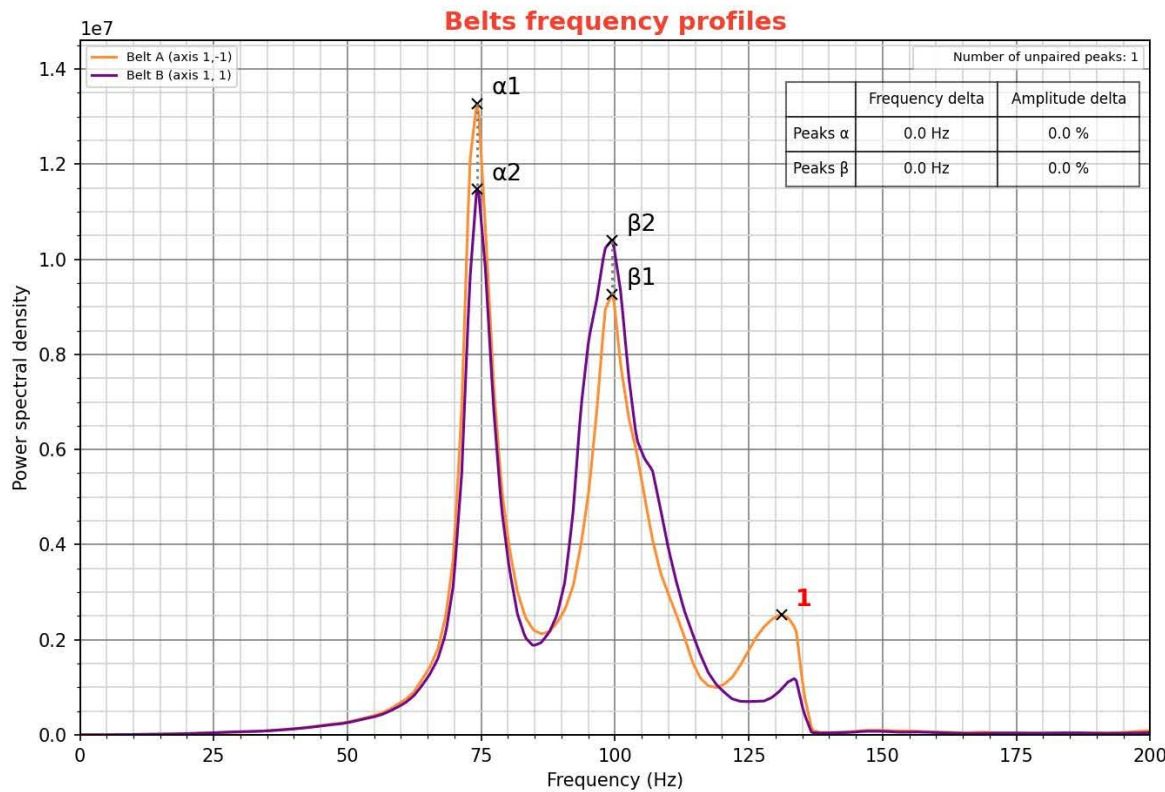


RELATIVE BELTS CALIBRATION TOOL

09/24/25 13:12:31 -- COREXY kinematics

| Mode: PULSE-ONLY -- ApH: 100.0
| Estimated similarity: 96.4%
| Excellent mechanical health (experimental)

v5.2.1



TMC Autotune



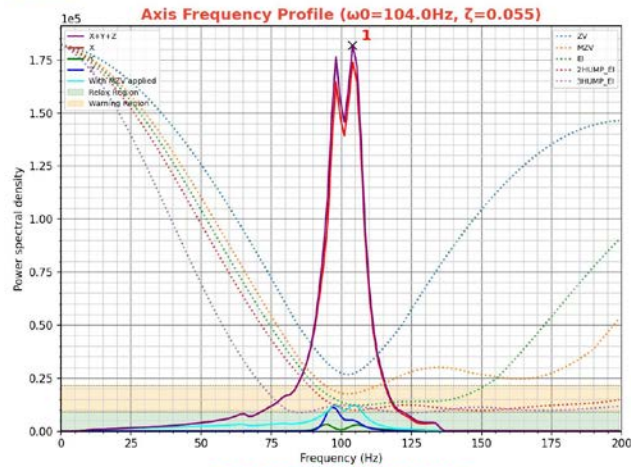
INPUT SHAPER CALIBRATION TOOL

09/24/25 13:21:11 -- X axis

Mode: PULSE-ONLY -- ApH: 100.0

Square corner velocity: 5.0 mm/s

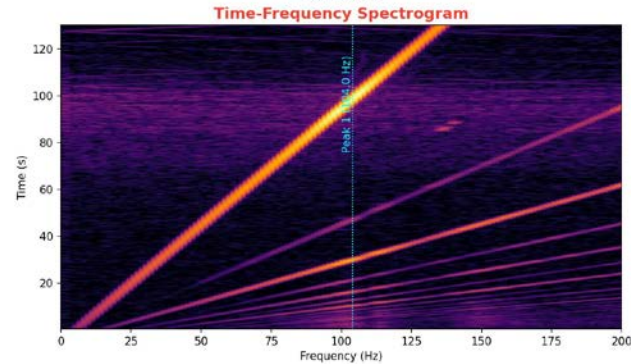
Allowed smoothing: default (=0.039)



Recommended filters:

- > Best shaper: MZV @ 101.4 Hz
- > Estimated damping ratio (ζ): 0.055

Type	Frequency	Vibrations	Smoothing	Max Accel
ZV	102.6 Hz	5.8 %	0.020	40600
MZV	101.4 Hz	0.9 %	0.023	30060
EI	121.2 Hz	0.0 %	0.024	27010
2HUMP_EI	149.8 Hz	0.0 %	0.028	24440
3HUMP_EI	149.8 Hz	0.0 %	0.039	15900



INPUT SHAPER CALIBRATION TOOL

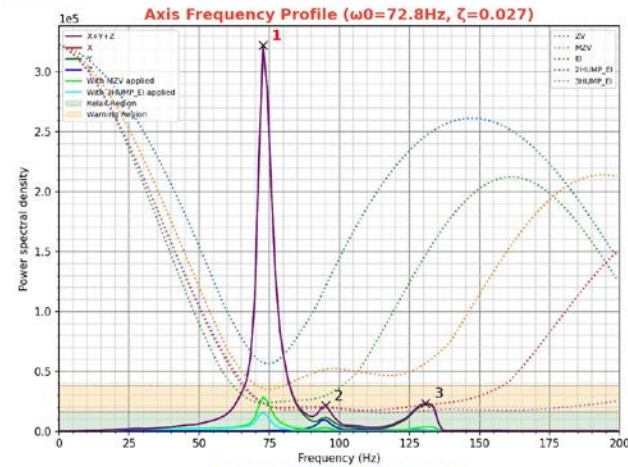
09/24/25 13:24:10 -- Y axis

Mode: PULSE-ONLY -- ApH: 100.0

Square corner velocity: 5.0 mm/s

Allowed smoothing: default (=0.049)

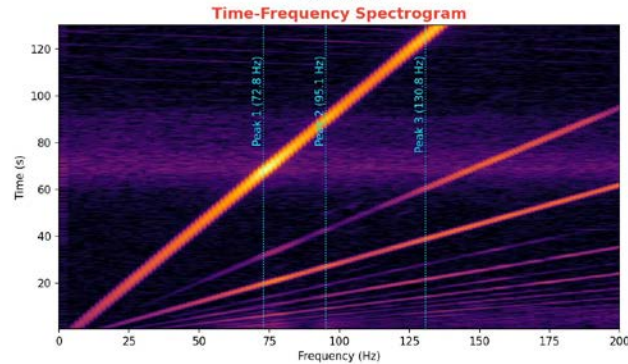
v5.2.1



Recommended filters:

- > For performance: MZV @ 73.8 Hz
- > For low vibrations: 3HUMP_EI @ 140.0 Hz
- > Estimated damping ratio (ζ): 0.027

Type	Frequency	Vibrations	Smoothing	Max Accel
ZV	75.0 Hz	7.1 %	0.032	21620
MZV	73.8 Hz	1.9 %	0.038	15880
EI	82.0 Hz	0.0 %	0.049	12310
2HUMP_EI	111.6 Hz	0.0 %	0.045	13480
3HUMP_EI	140.0 Hz	0.0 %	0.044	13740



TMC Autotune

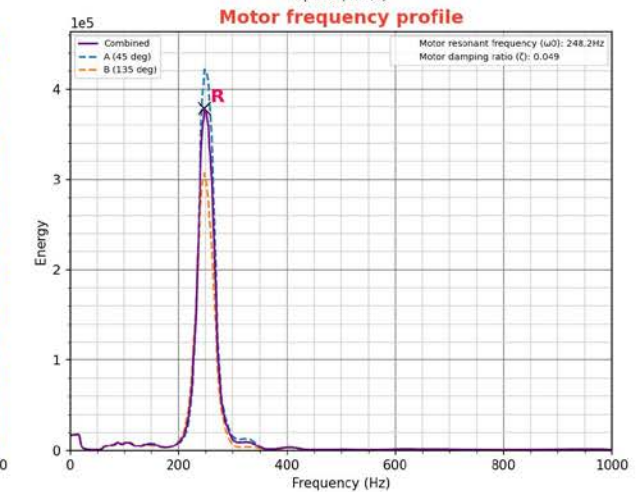
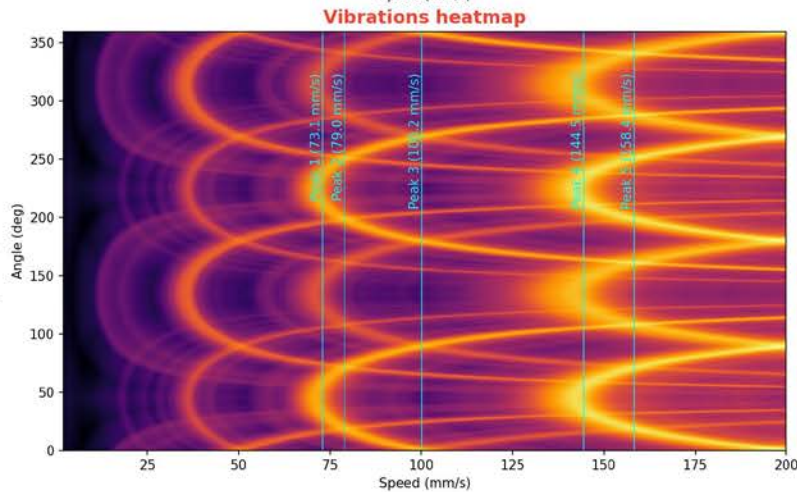
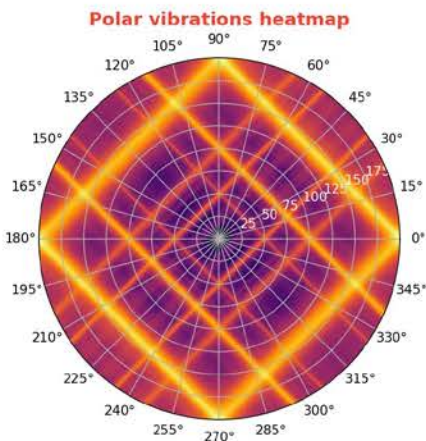
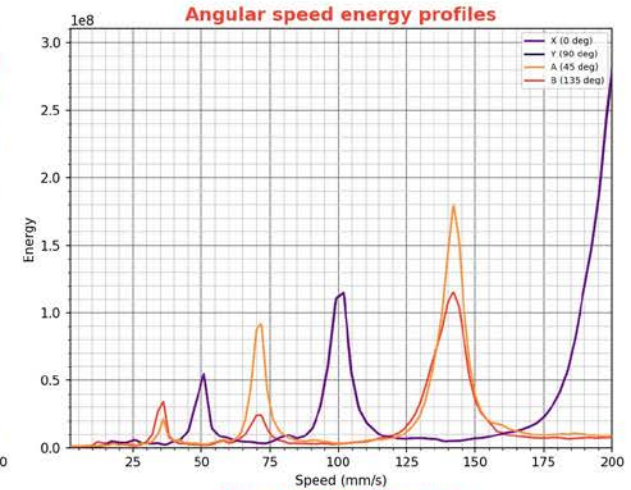
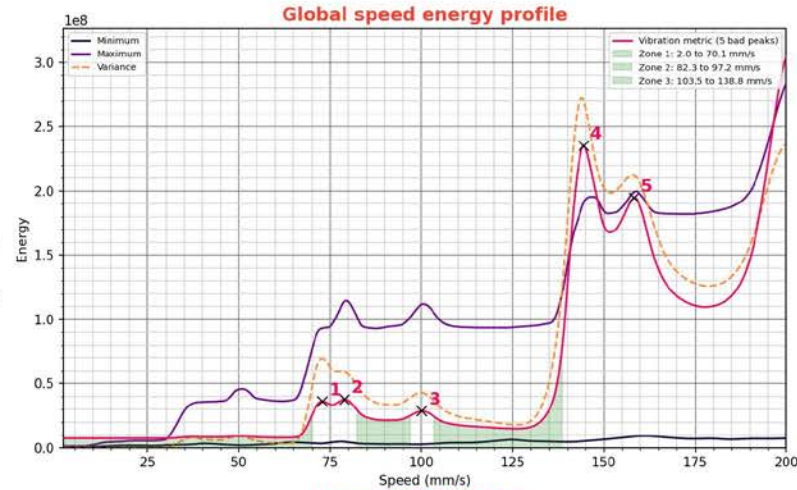
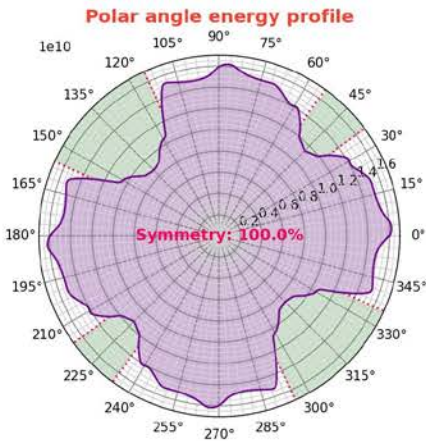


MACHINE VIBRATIONS ANALYSIS TOOL

09/24/25 13:28:04 at 3000 mm/s² -- COREXY kinematics

X motor: SIBOOR-42STH48-2504(S45) on TMC5160 @ 24.0V 1.50A - 32ustepsCHOPCONF: toff=1 hstrt=4 hend=3 tbi=1 tpdf=1 intpol=1 dedge=1
Y motor: SIBOOR-42STH48-2504(S45) on TMC5160 @ 24.0V 1.50A - 32ustepsPWMCONF: ofs=21 grad=11 freq=2 autoscale=1 autograd=1 reg=15 lim=4
TMC Autotune enabled (PWM freq target: X=55kHz / Y=55kHz)
COOLCONF: semin=2 seup=3 semax=4 sedn=2 semin=1 sgt=1
THRS: tpwmthrs=1048575 tcoolthrs=313

v5.2.1



Top=TMC Autotune / Bottom =Chopper Tune



All slicer settings the same

Discussion

- From looking at the graphs and the prints there does not appear to be a material difference in the result arising from the difference in settings.
- Frankramm stated that subjectively the volume of the motors is less with Chopper Tune than TMC Autotune.
- Andrewmcgr stated that there could be a sound difference as the hysteresis is set differently, though set to a similar total value. The waveform created by the drivers will be different. However, Andrew is not sure why the sound would be quieter with Chopper Tune, but would expect the Chopper Tune settings to run the motor hotter.

Subjective Conclusion

- Based upon the results here the end result is the same.
- I would recommend continue to use TMC_Autotune because it is easier to install, and easier to modify the settings (i.e. silent, performance, individual registers, etc.)