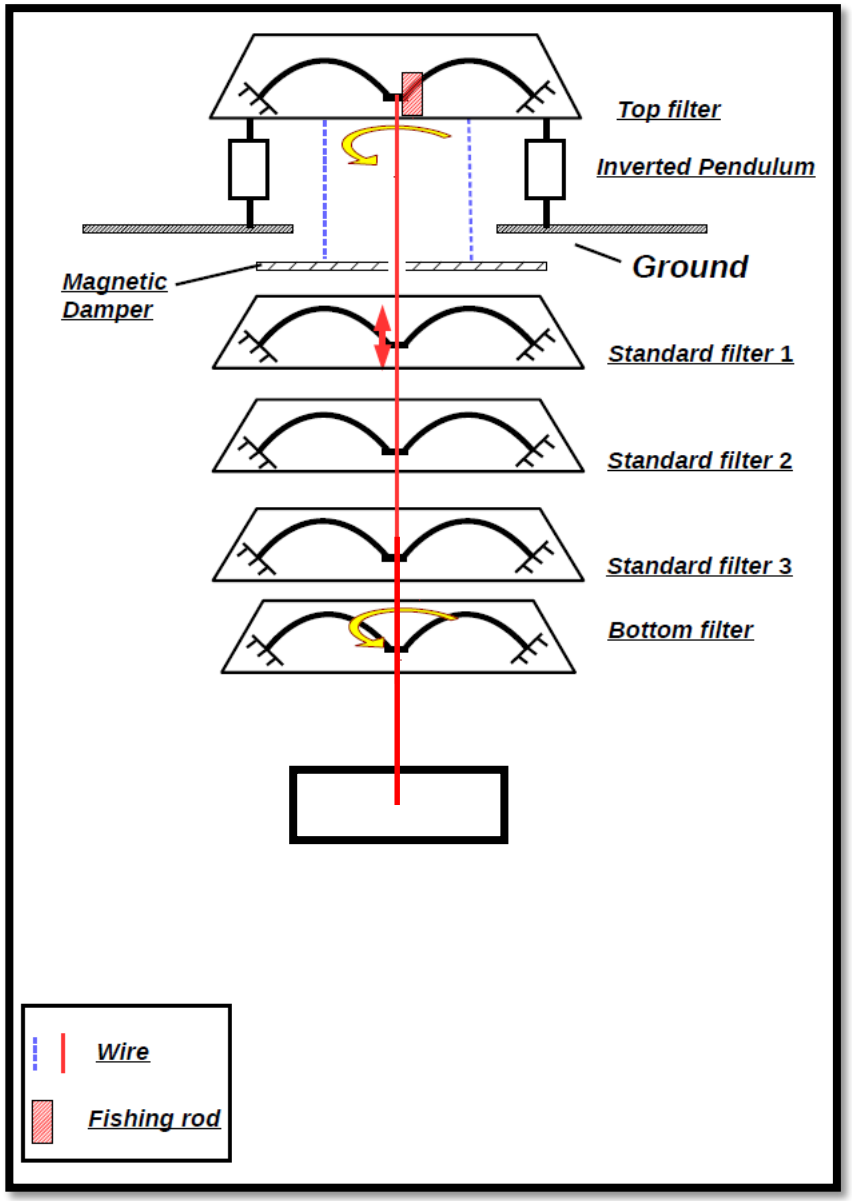
TypeA with dummy mass



Mechanical response

Calculated by SUMCON (and Simulink)

SUMCON in Mathematica
spension odel structor

SUMCON Version:1.32

About SUMCON | Version Info | Reflesh

New Model | Load Model | Save Model | 160401_TypeA_wDM_okv1.m

TypeA_wDM_kov1

Model Construction | Calculation Result | Export Model

Model Basic Information

Degrees of Freedom:

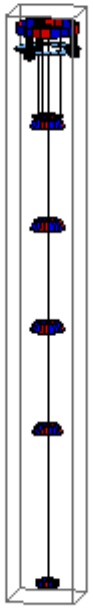
39 State Variables
6 Input Variables
5 Float Variables

Ground Position:

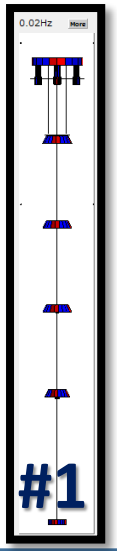
xg → 0. yg → 0. zg → 0. pitchg → 0. yawg → 0. rollg → 0.

Equilibrium Point:

xF0 → 0.	zF0 → 0.	yawF0 → 0.	xMD → 0.	yMD → −1.557	zMD → 0.
pitchMD → 0.	yawMD → 0.	rollMD → 0.	xSF1 → 0.	ySF1 → −1.6993	zSF1 → 0.
pitchSF1 → 0.	yawSF1 → 0.	rollSF1 → 0.	xSF2 → 0.	ySF2 → −4.0526	zSF2 → 0.
pitchSF2 → 0.	yawSF2 → 0.	rollSF2 → 0.	xSF3 → 0.	ySF3 → −6.3991	zSF3 → 0.
pitchSF3 → 0.	yawSF3 → 0.	rollSF3 → 0.	xBF → 0.	yBF → −8.7668	zBF → 0.
pitchBF → 0.	yawBF → 0.	rollBF → 0.	xDM → 0.	yDM → −12.3531	zDM → 0.
pitchDM → 0.	yawDM → 0.	rollDM → 0.	hGAS0 → −0.0433	hGAS1 → −0.0533	hGAS2 → −0.0665
hGAS3 → −0.0876	hGAS4 → −0.1263				



Eigen Mode List



Resonance frequency

Eigen mode shape

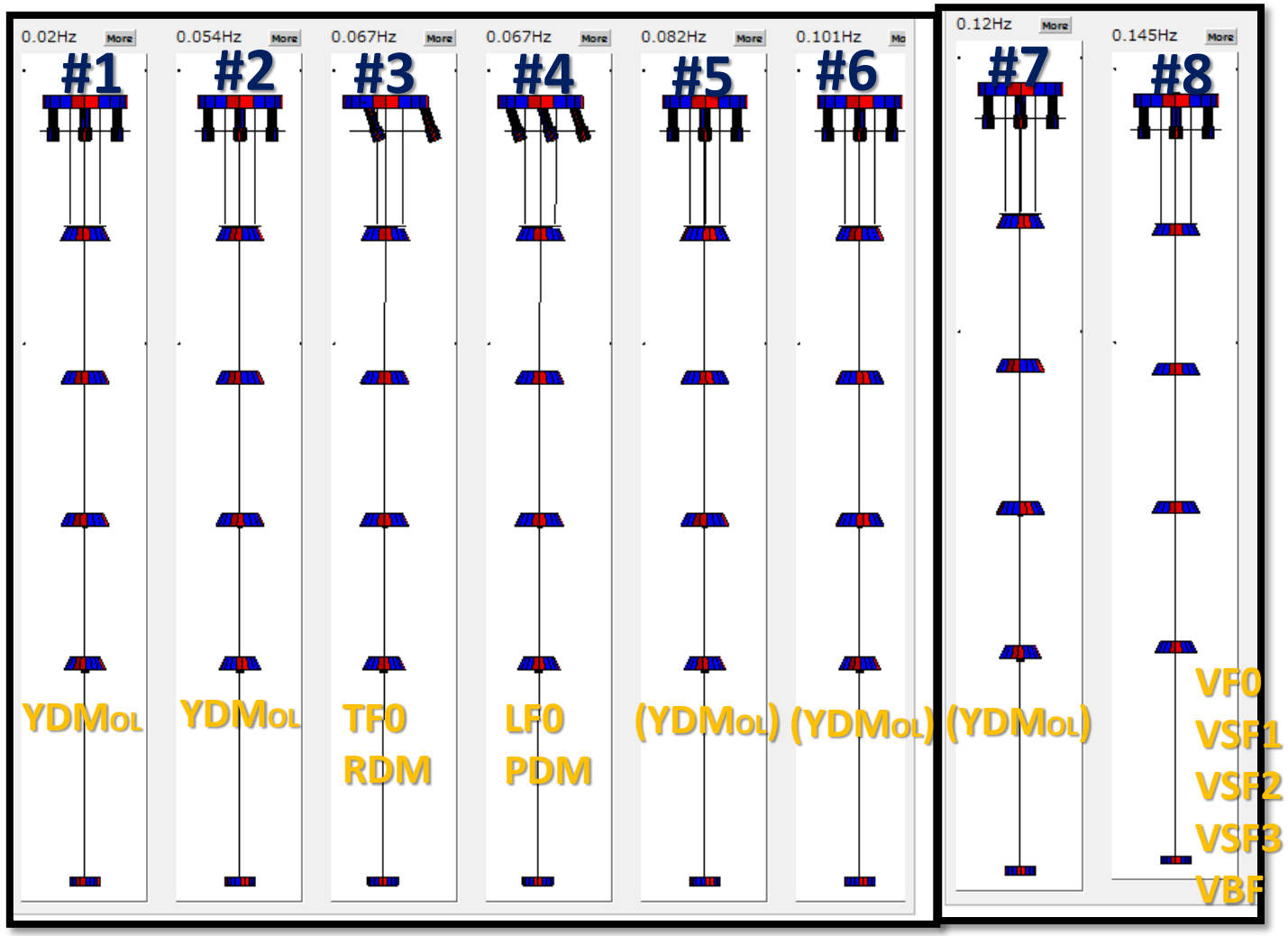
RIM ← Sensing / Excitation point

() ← Hardly seen/excited

× ← Cannot be seen/excited

Eigen mode number

Eigen Mode Shape



#1 : YWholeChain

#2 : YDM

#3 : TF0

#4 : LF0

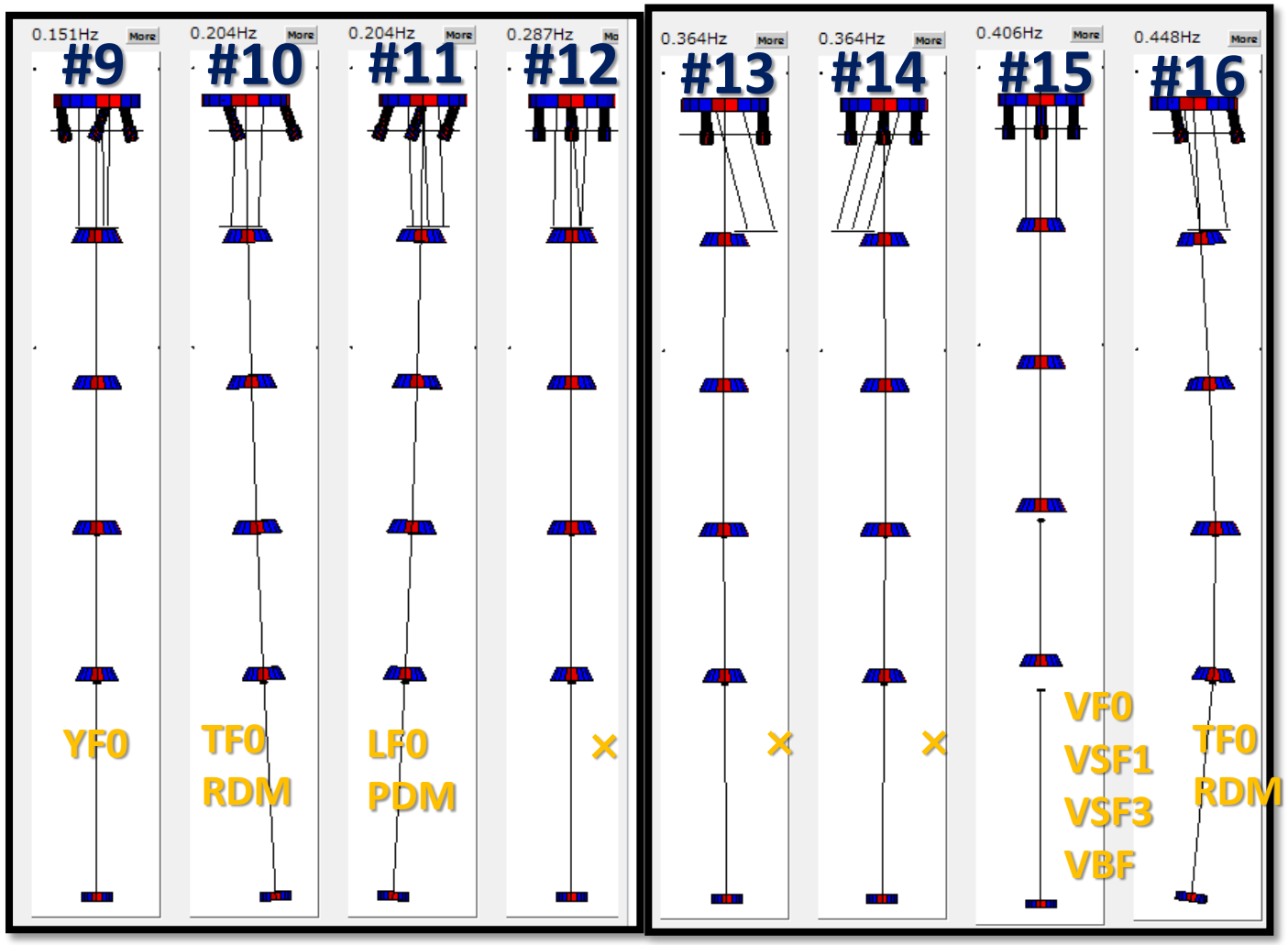
#5 : YDM

#6 : YBF

#7 : YSF2

#8 : VDM

Eigen Mode Shape



#9 : YDM

#10 : TMD

#11 : LMD

#12 : YMD

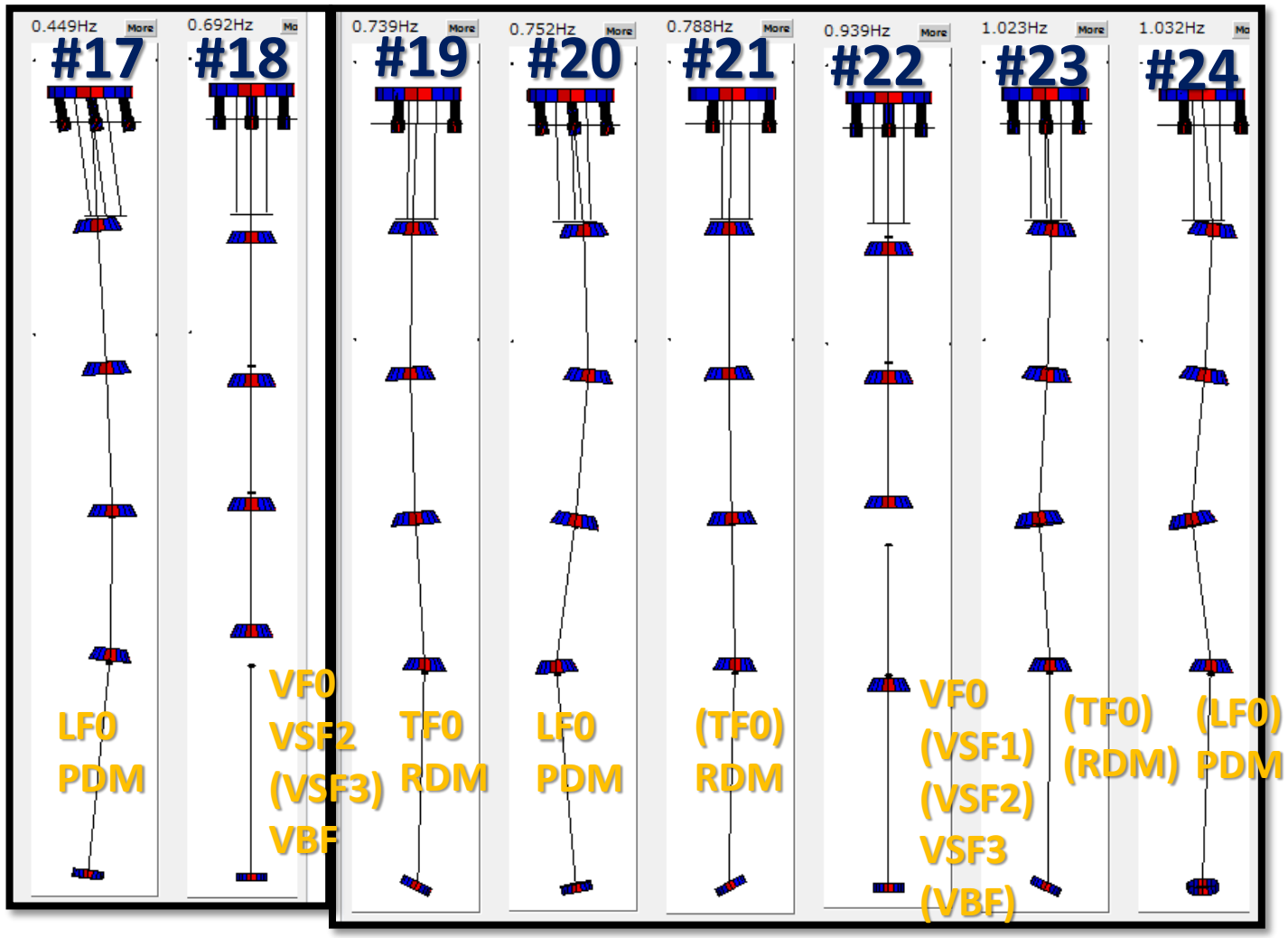
#13 : TMD

#14 : LMD

#15 : VSF3

#16 : TSF3

Eigen Mode Shape



#17 : LSF3

#18 : VBF

#19 : Pendulum

#20 : LBF

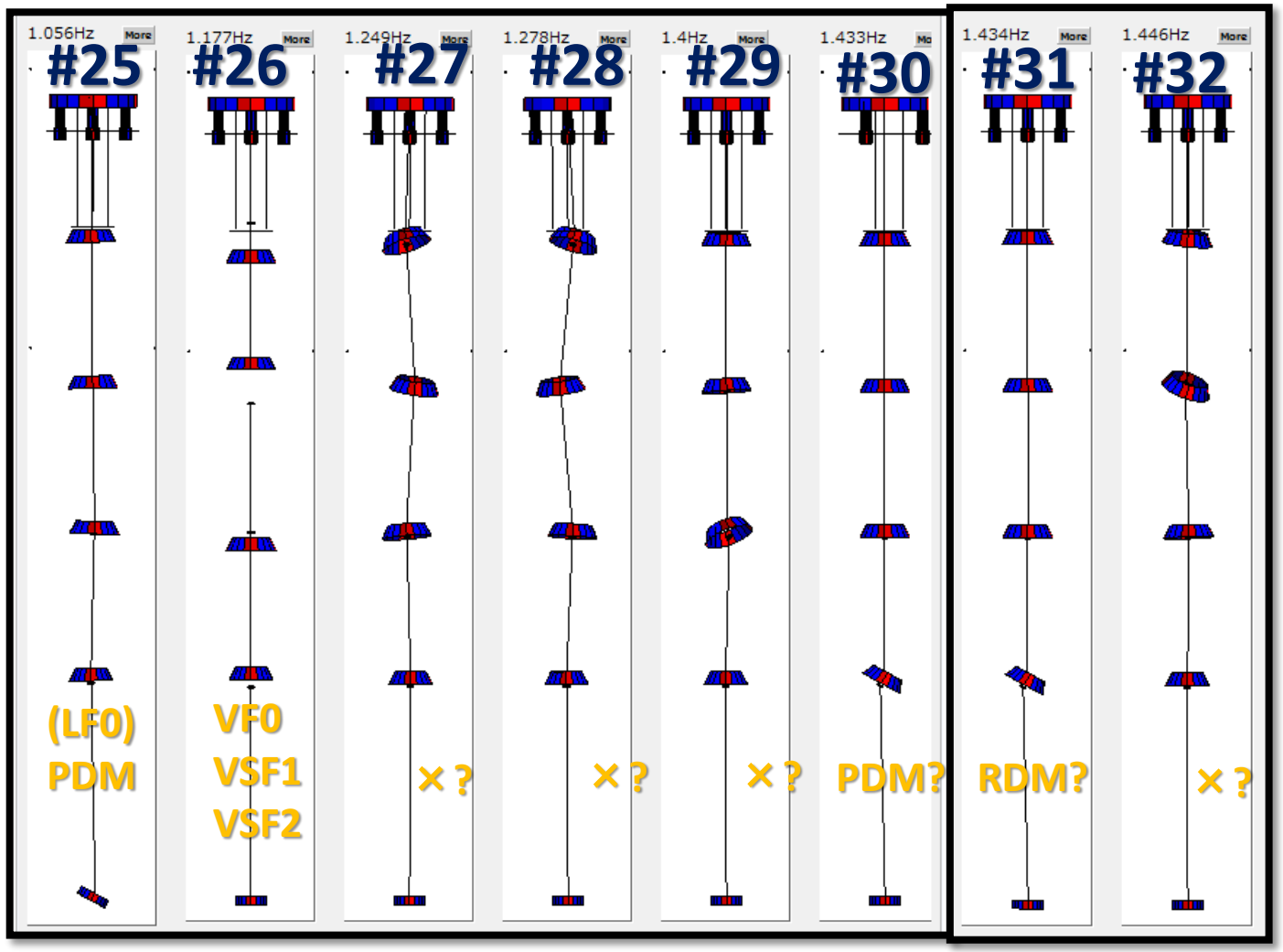
#21 : RDM

#22 : VSF3

#23 : Pendulum

#24 : Pendulum

Eigen Mode Shape



#25 : PDM

#26 : VSF2

#27 : PSF1, PSF2

#28 : Pendulum

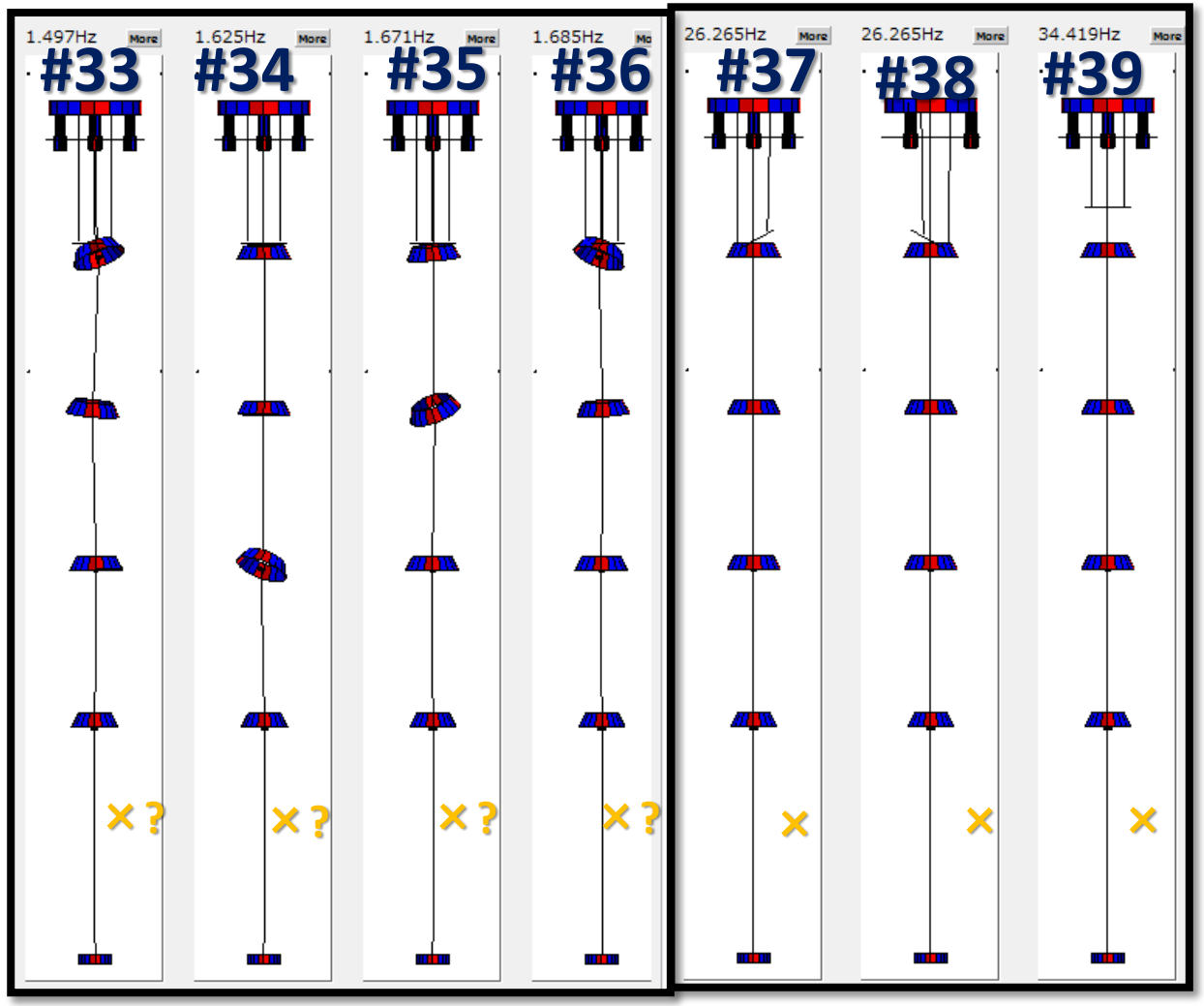
#29: PSF3, RSF3

#30 : RBF

#31 : PBF

#32 : PSF2, RSF2

Eigen Mode Shape



#33 : PSF2, RSF1

#34 : -PSF3, RSF3

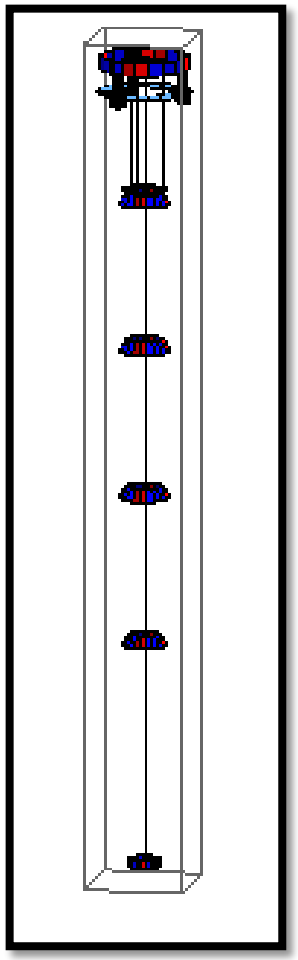
#35 : PSF2, -RSF2

#36 : -PSF1, RSF1

#37 : PMD

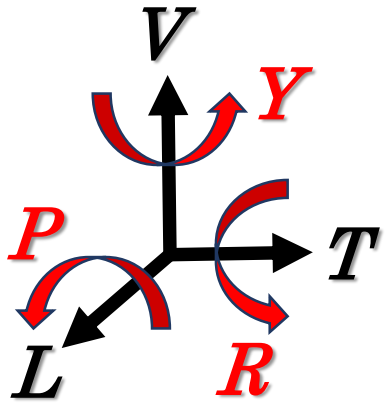
#38 : RMD

#39 : VMD



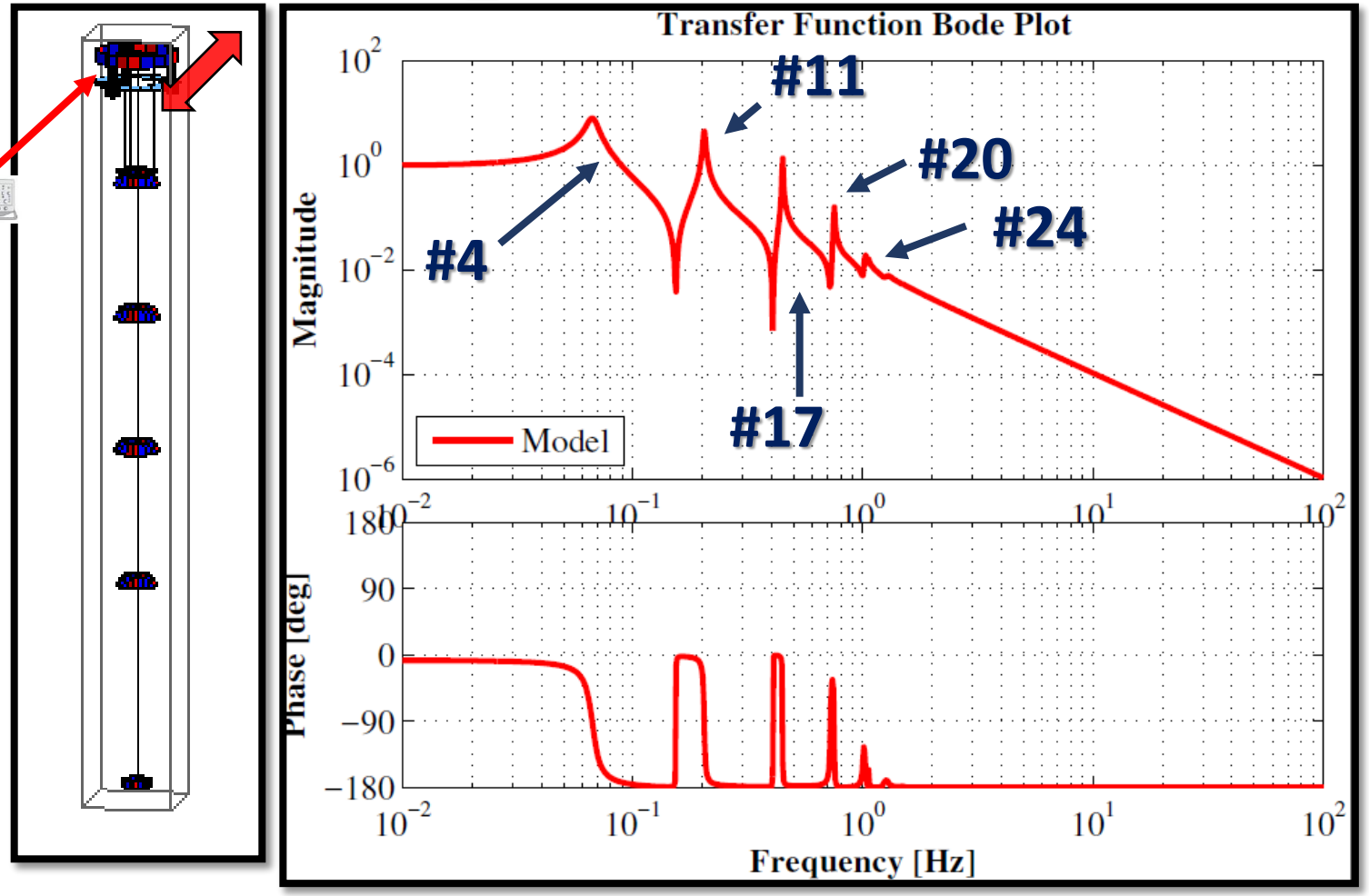
Force Transfer Functions

(, which can be measured, with No ctrl)



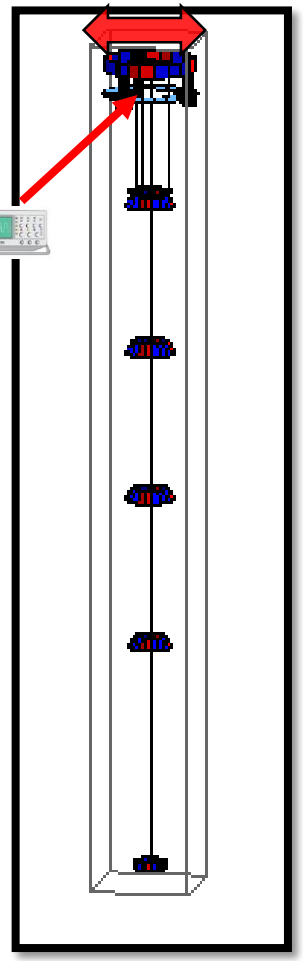
Force Transfer Function

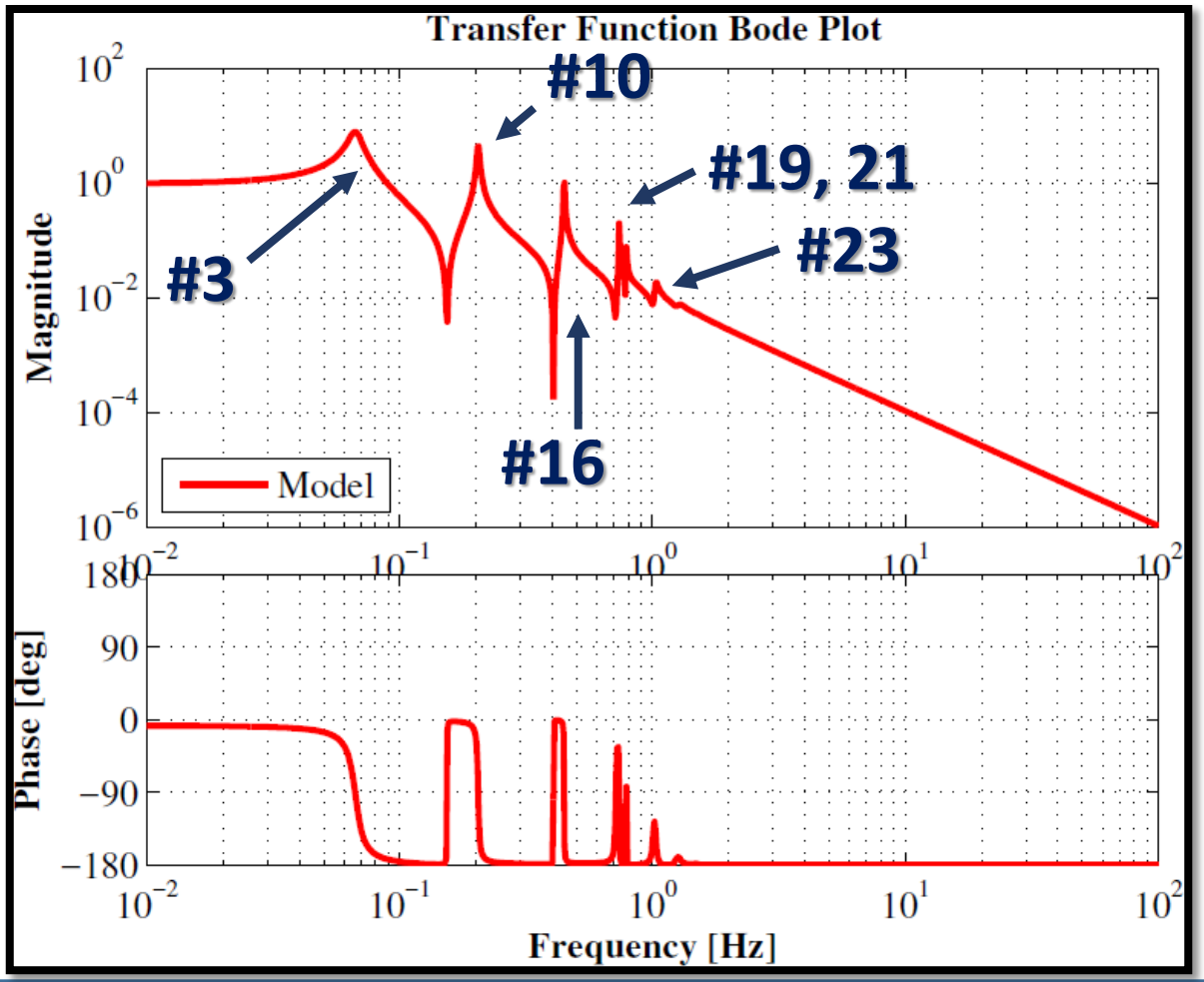
LVDT_LF0 / actLF0



Force Transfer Function

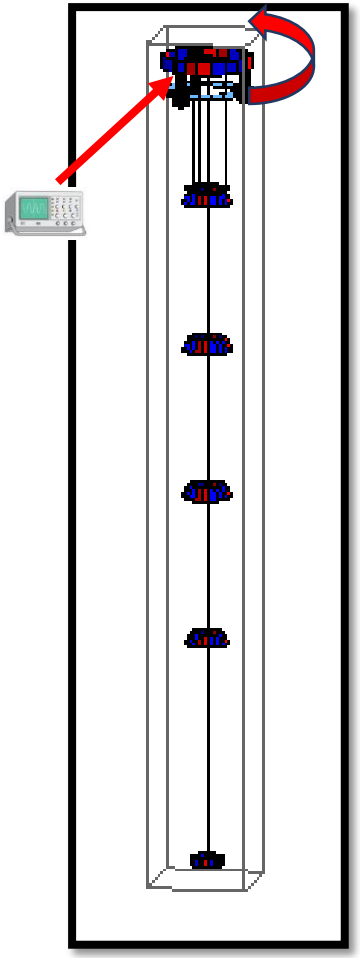
LVDT_TF0 / actTF0

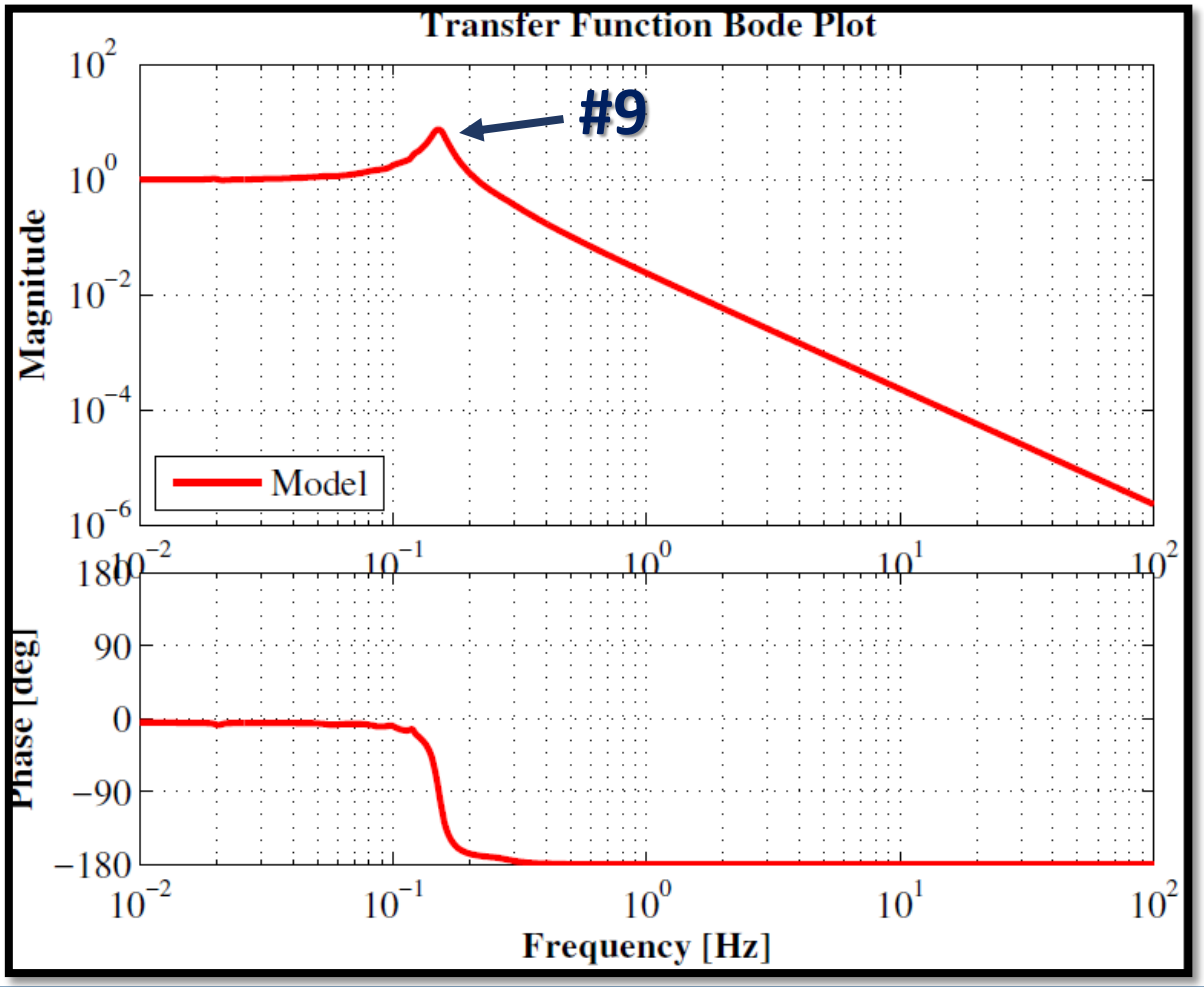




Force Transfer Function

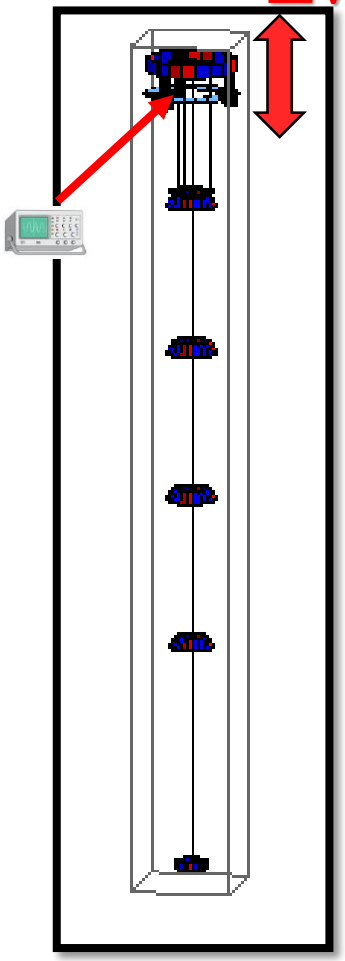
LVDT_YF0 / actYF0

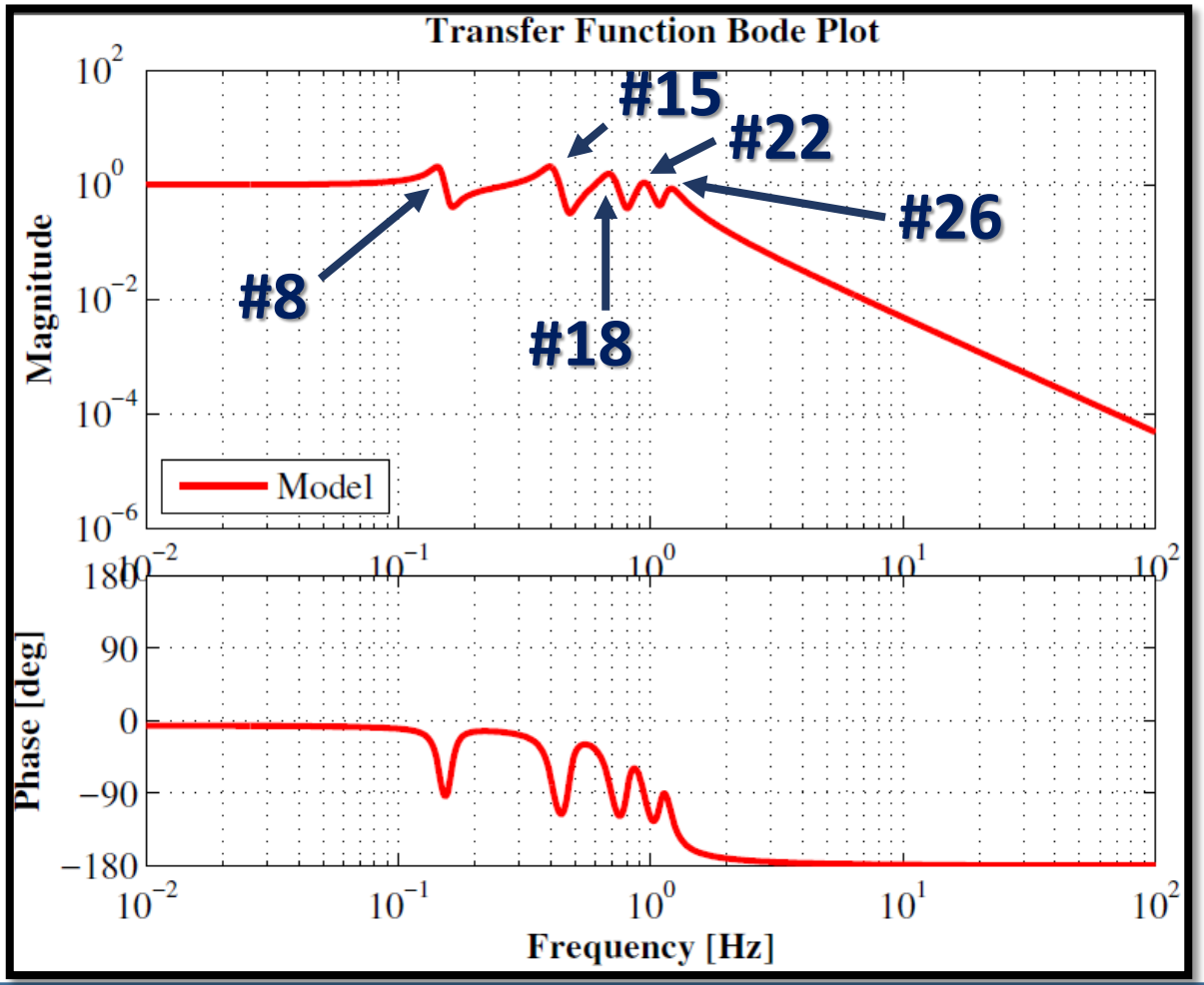




Force Transfer Function

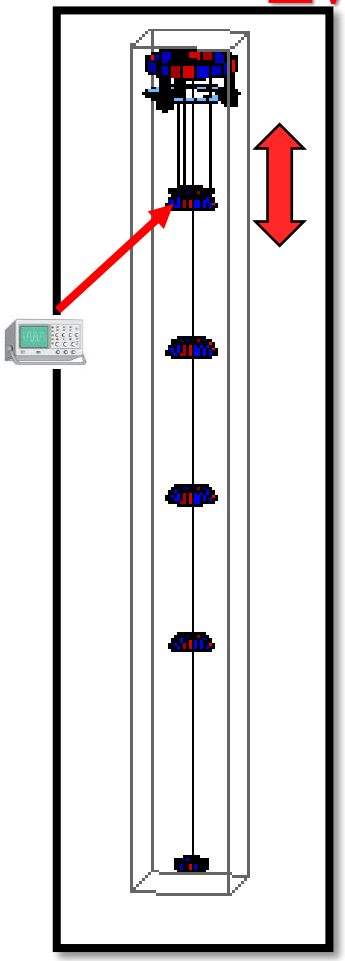
LVDT_VF0 / actVF0

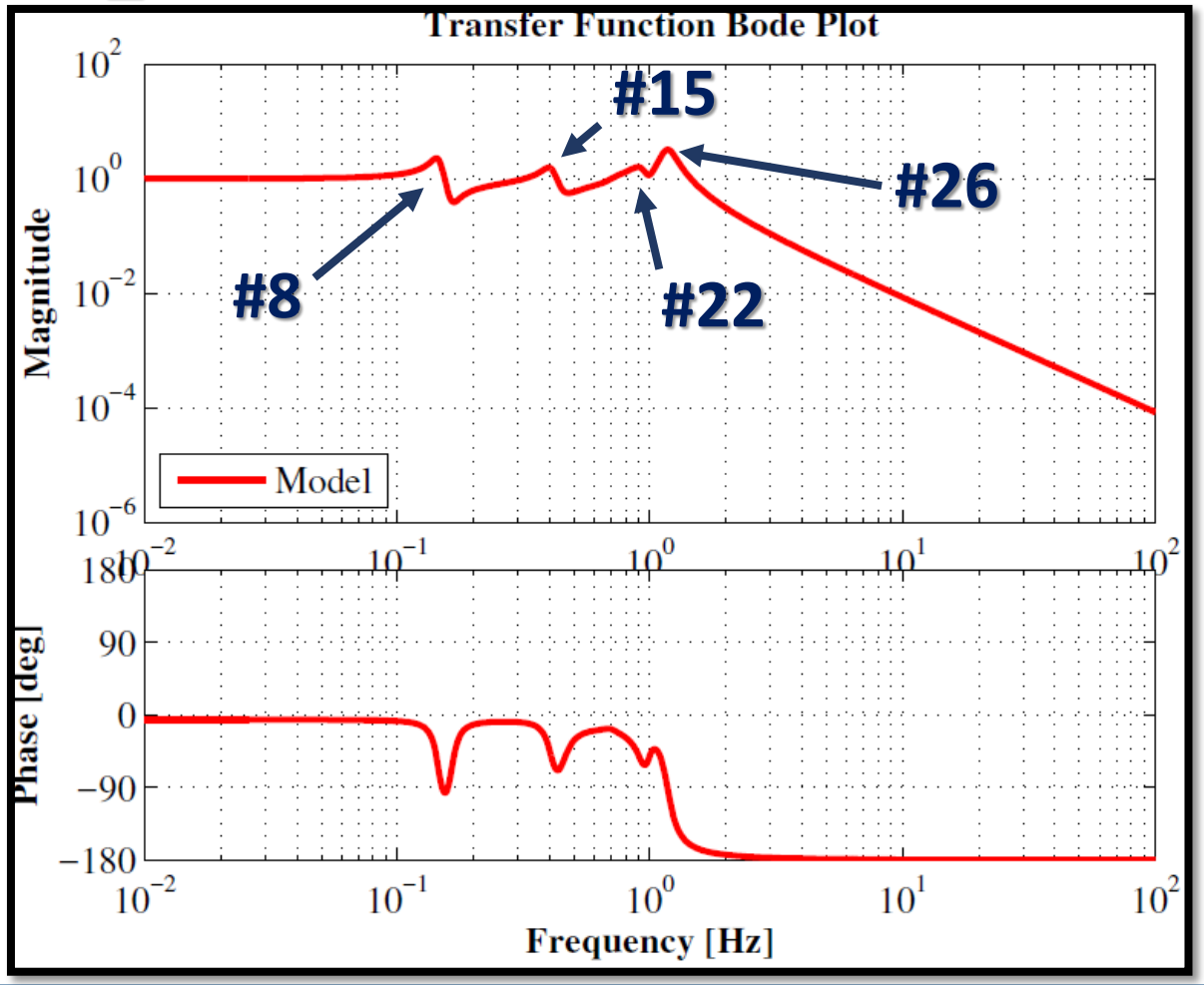




Force Transfer Function

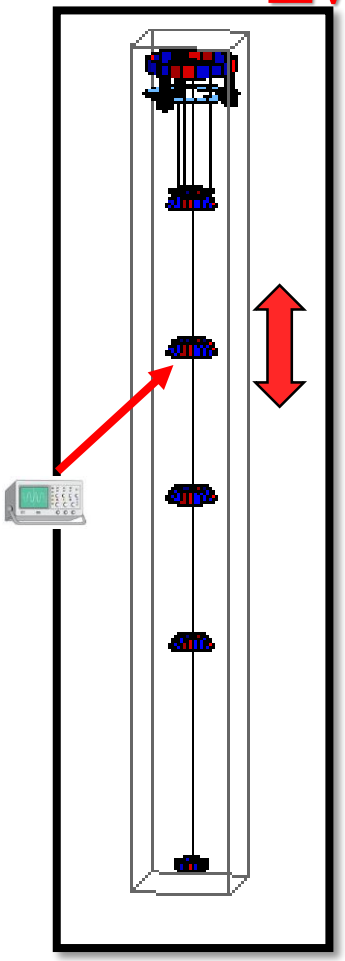
LVDT_VSF1 / actVSF1

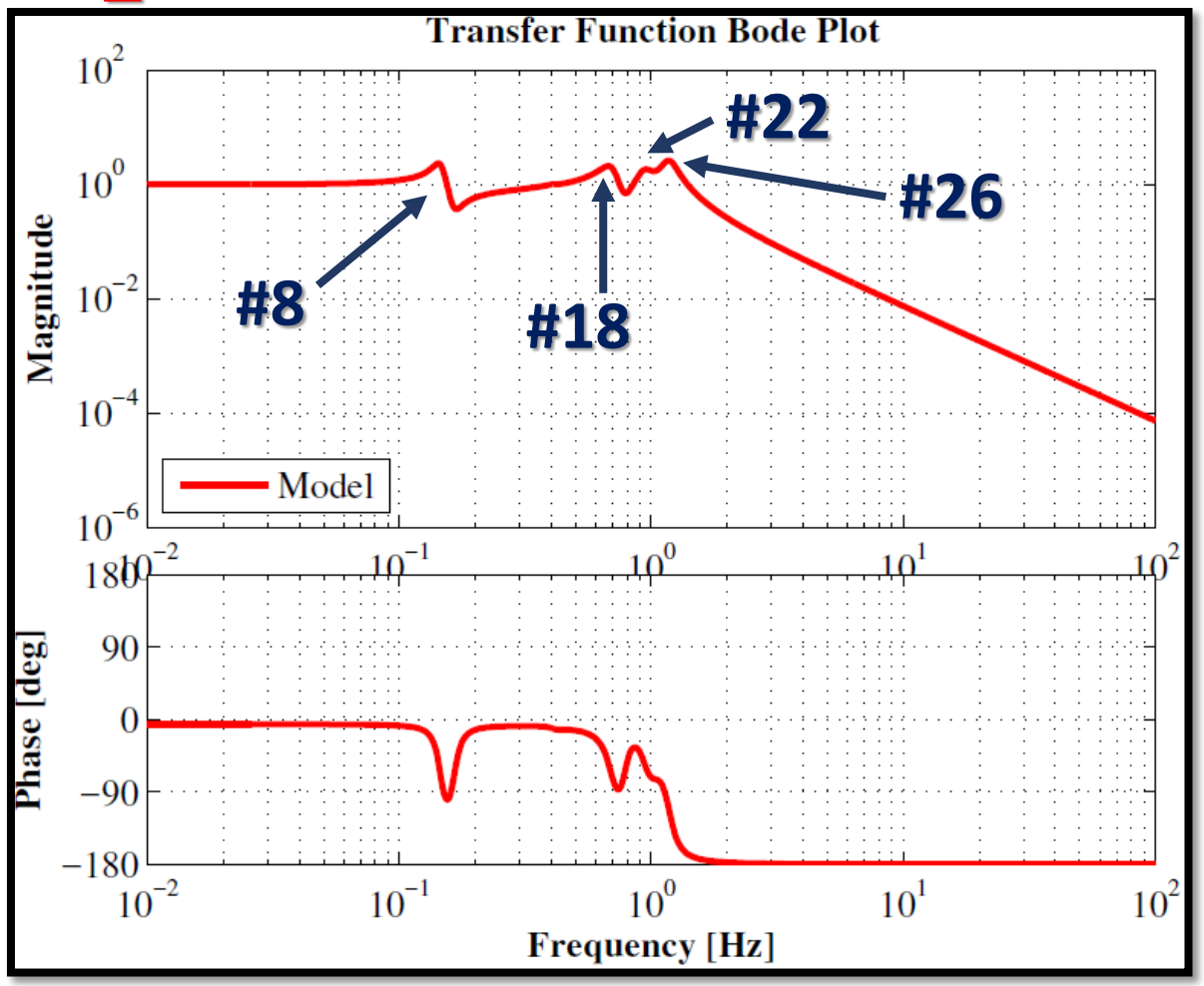




Force Transfer Function

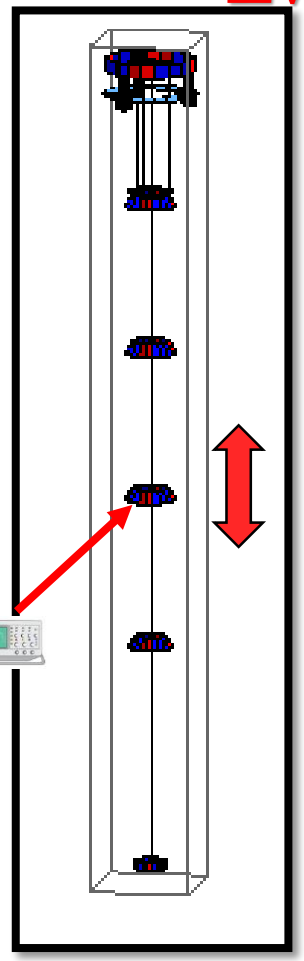
LVDT_VSF2 / actVSF2

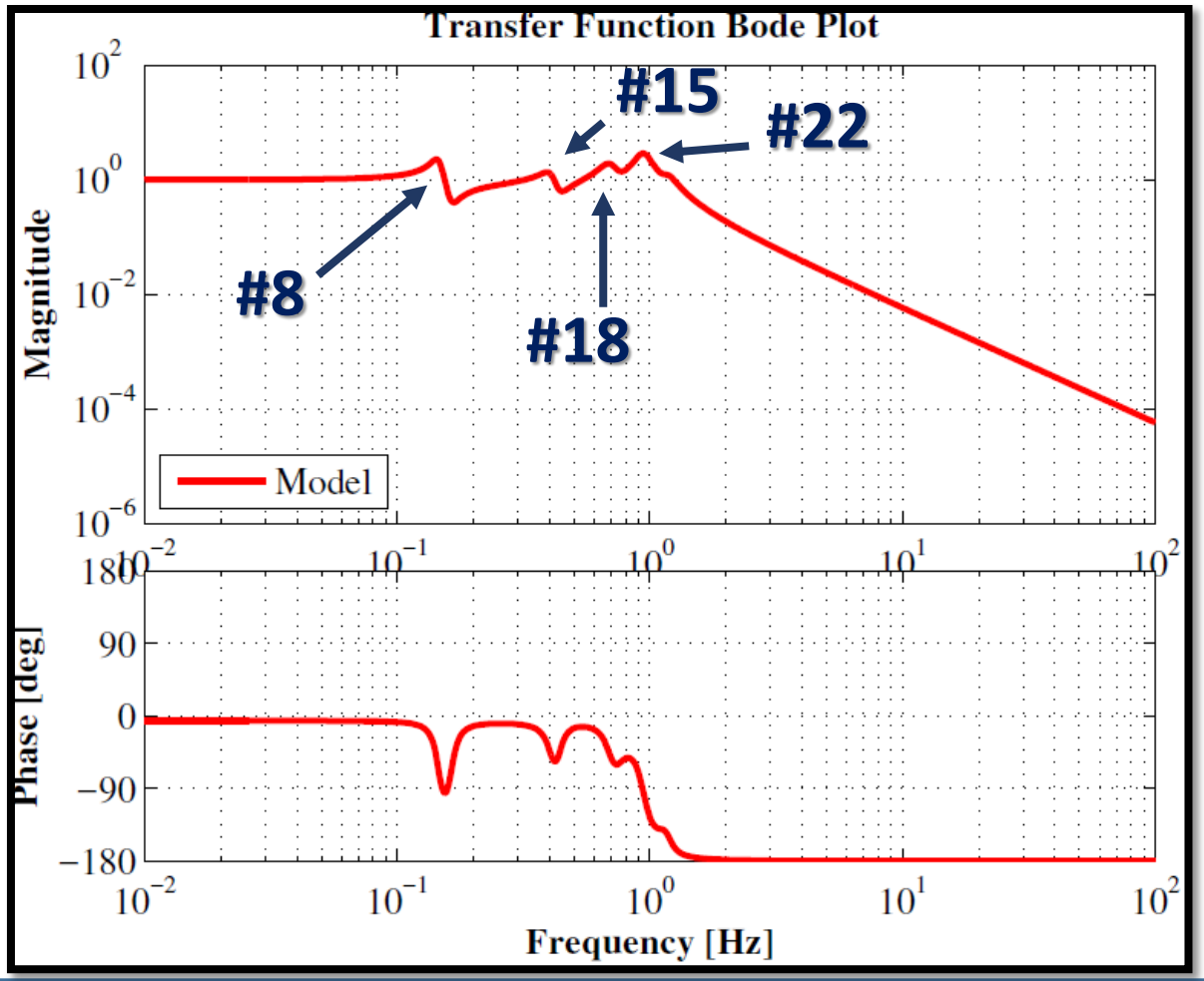




Force Transfer Function

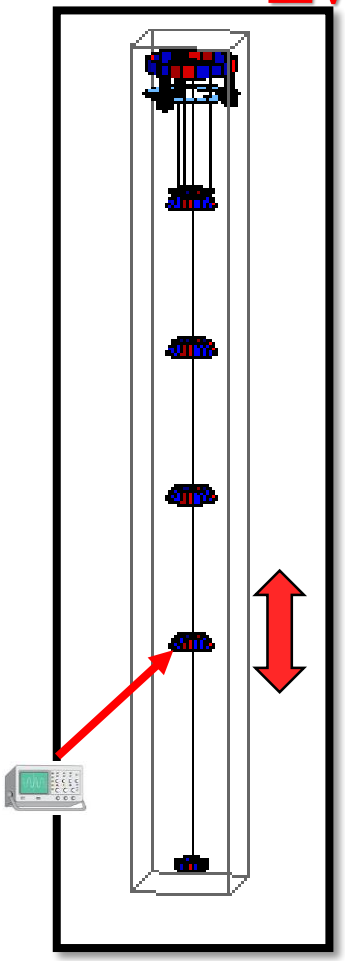
LVDT_VSF3 / actVSF3

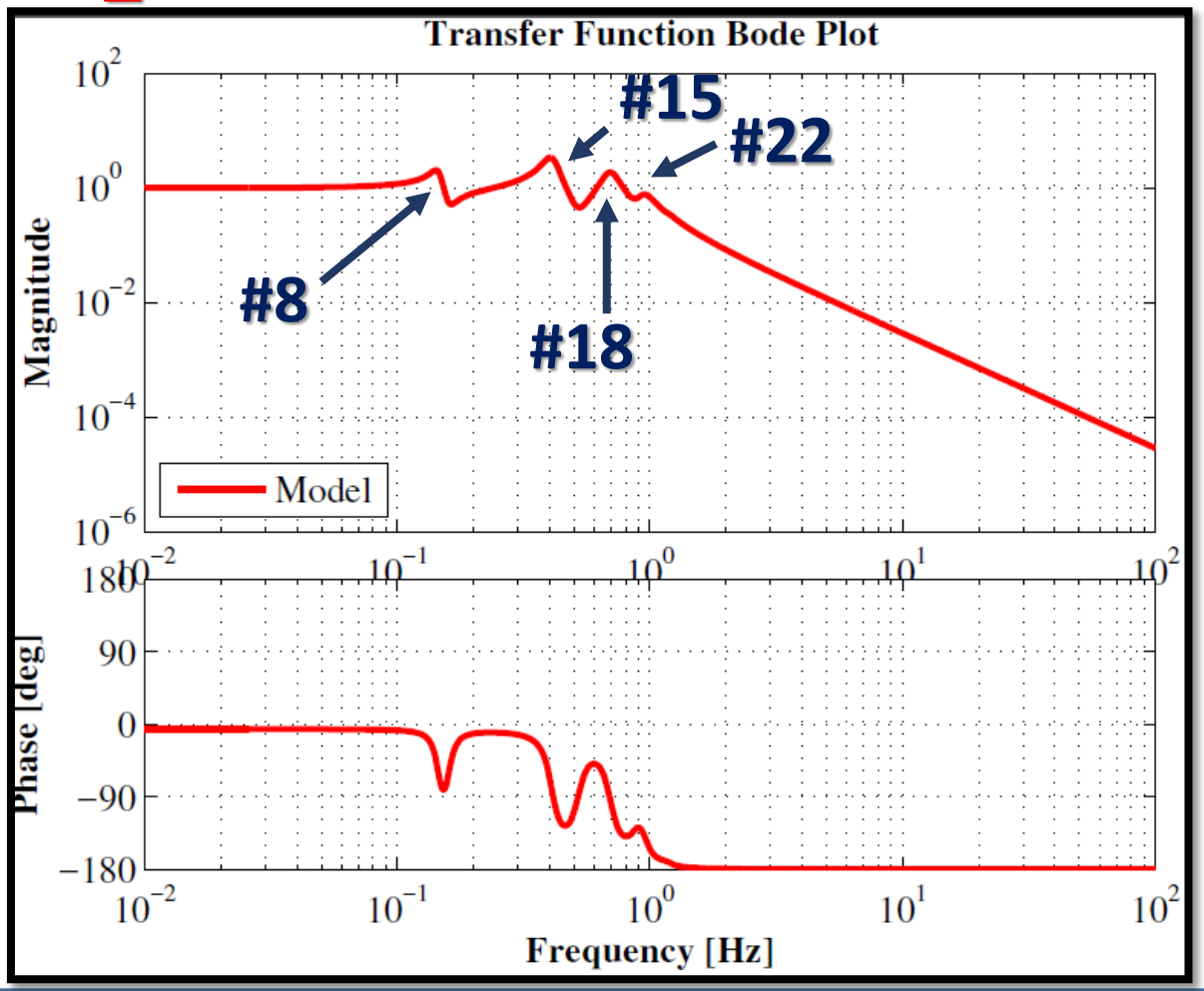




Force Transfer Function

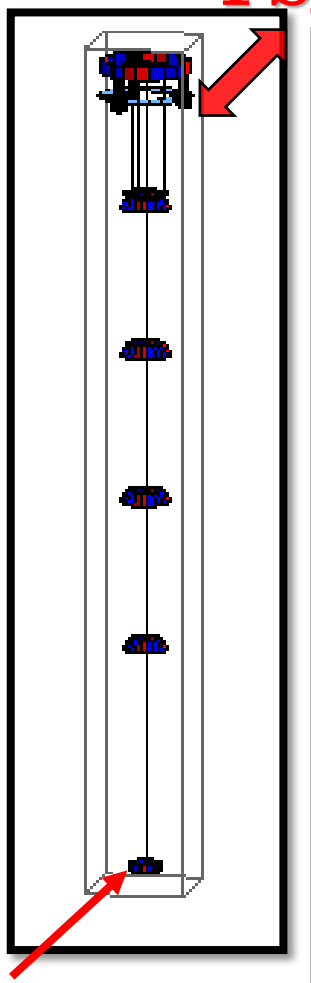
LVDT_VBF / actVBF

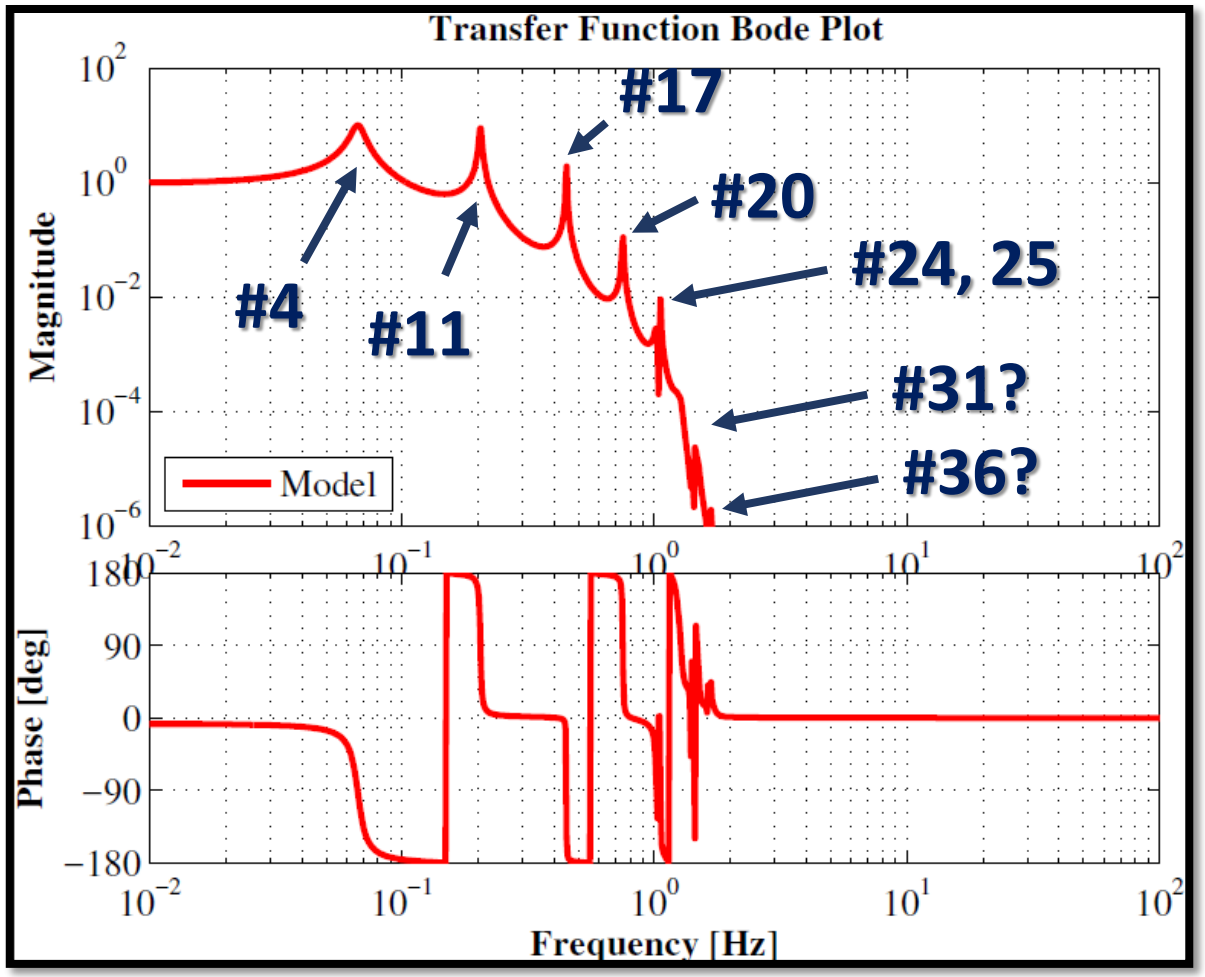




Force Transfer Function

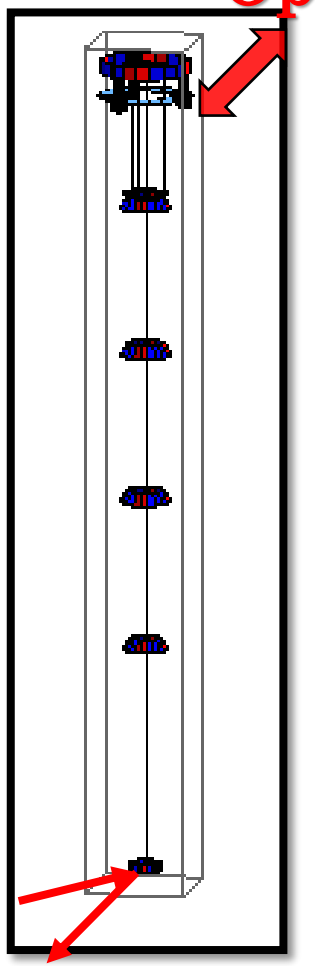
PS_LDM / actLF0

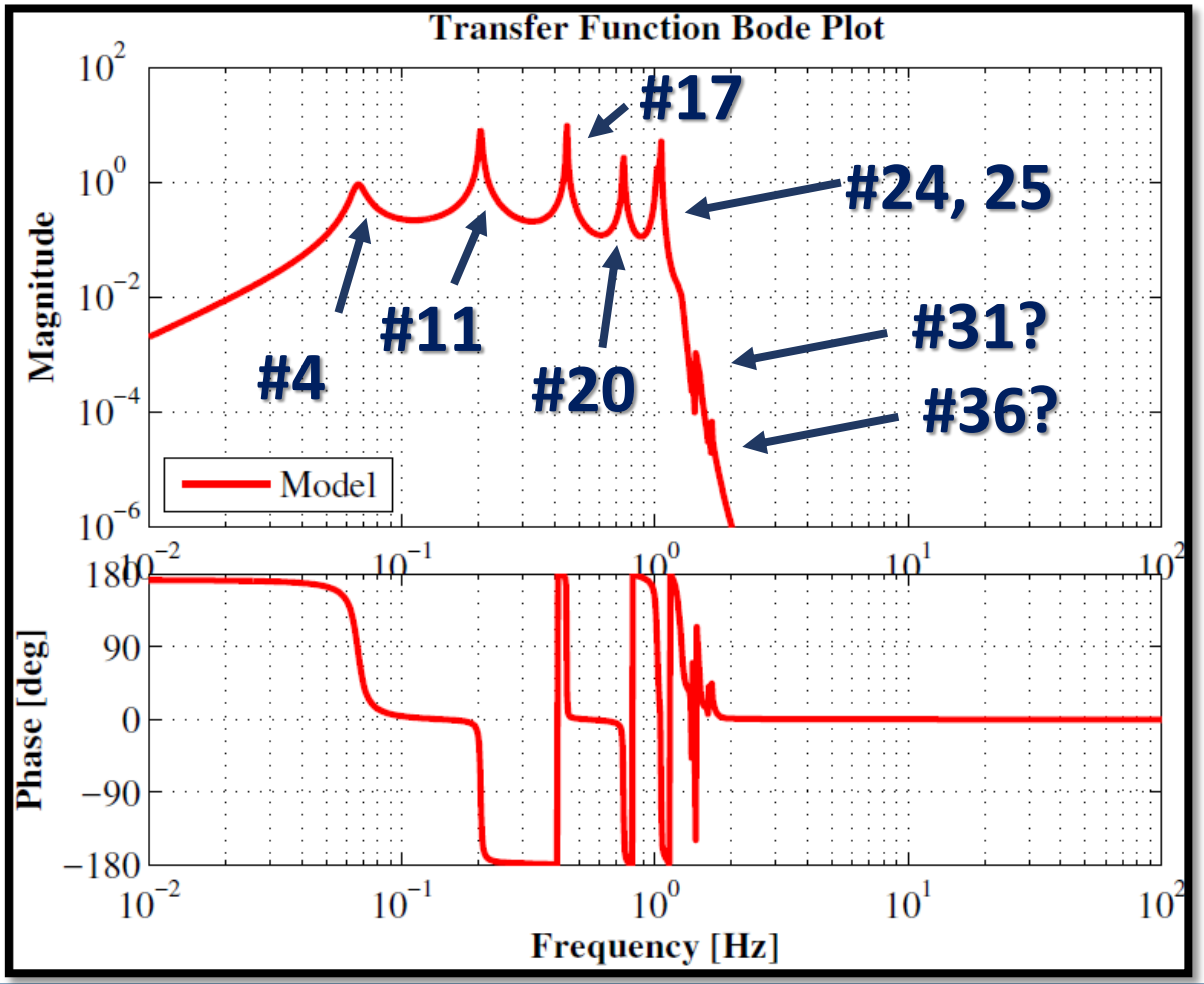




Force Transfer Function

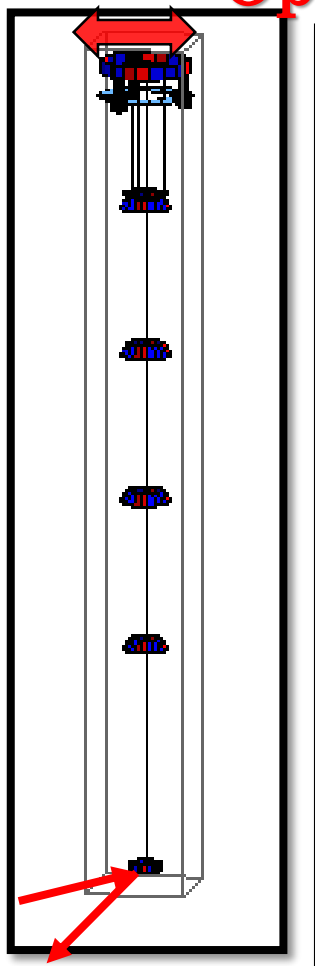
OpLev_PDM / actLF0

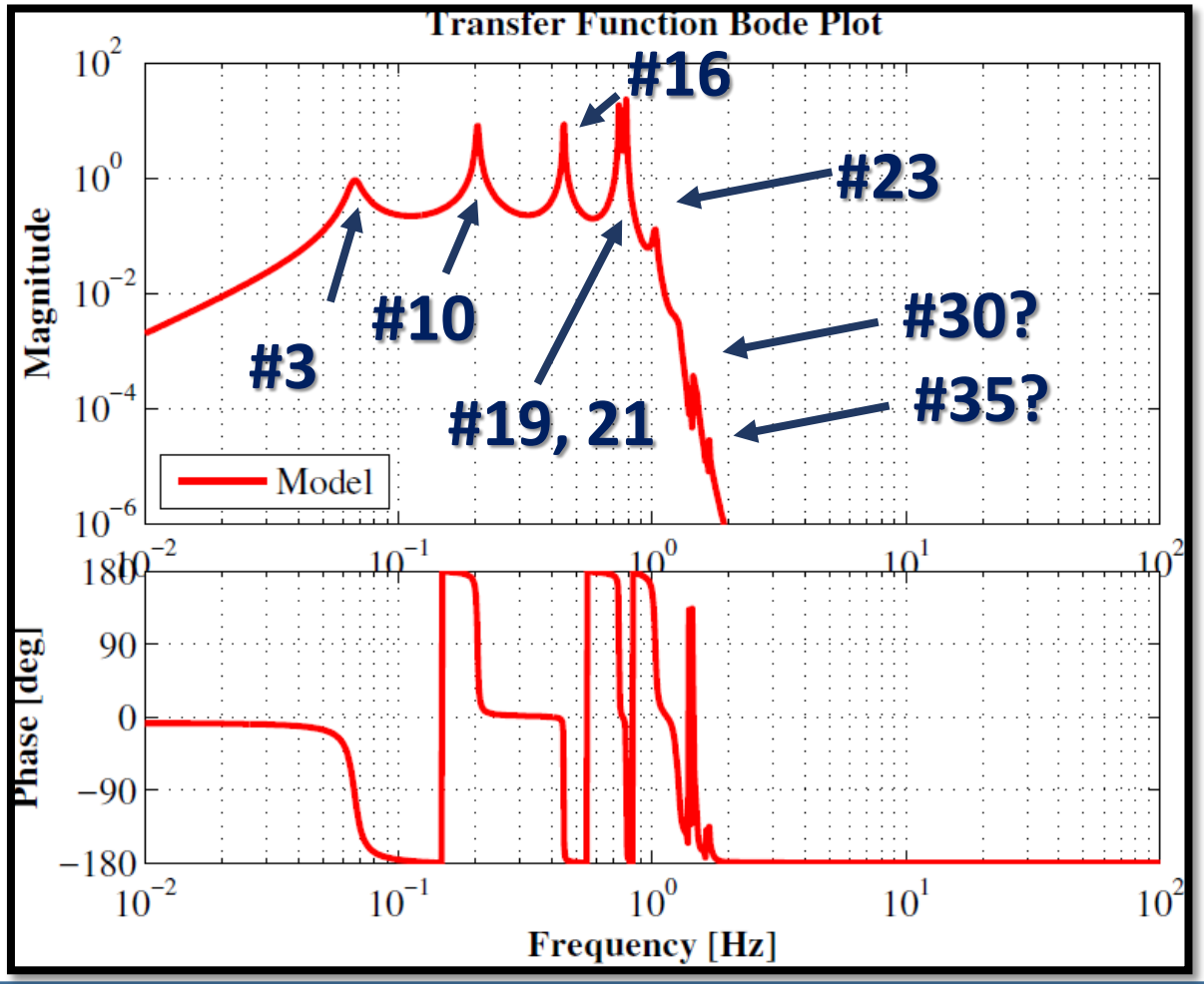




Force Transfer Function

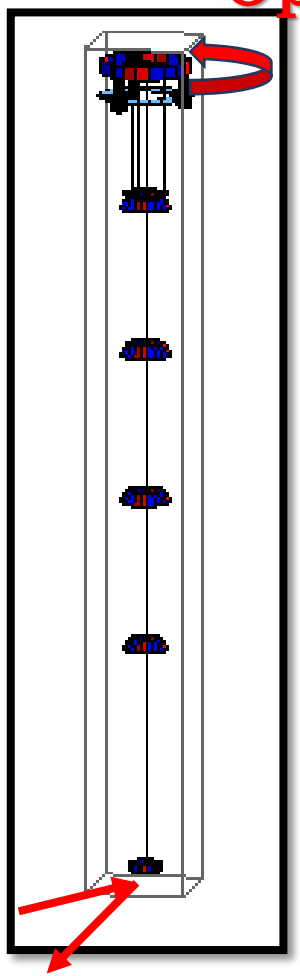
OpLev_RDM / actTF0

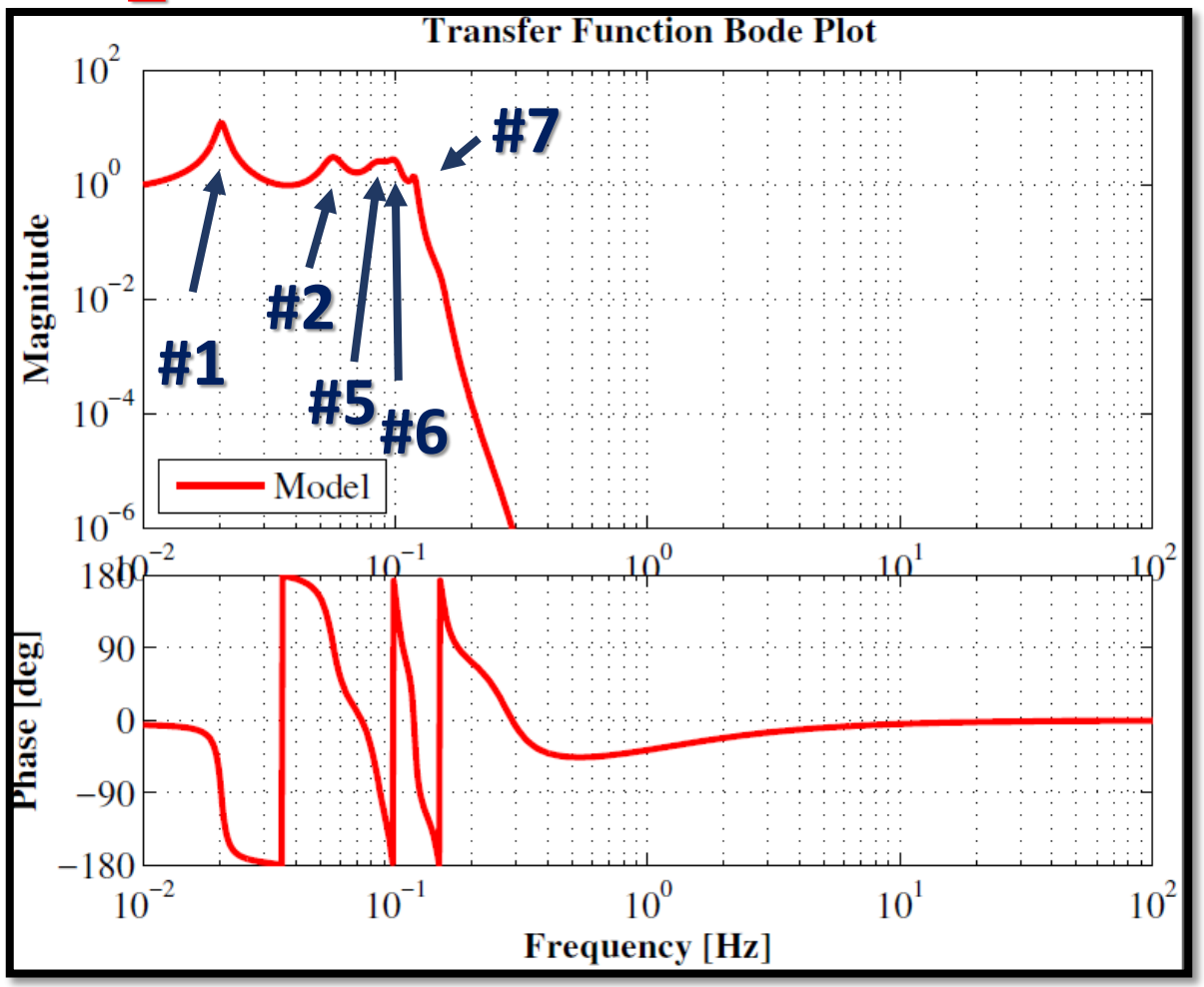




Force Transfer Function

OpLev_YDM / actYF0





Spectra

without control

using 90 percentile seismic noise

❖ From http://gwdoc.icrr.u-tokyo.ac.jp/DocDB/0039/T1503908/002/TypeBpDesign.pdf

2 Seismic noise level at the Kamioka site

The seismic displacement and velocity we used is shown in Fig.2 and ??[2]. This is the one called high-noise model. The seismic displacement in Kamioka is below this level for 90 % of time.

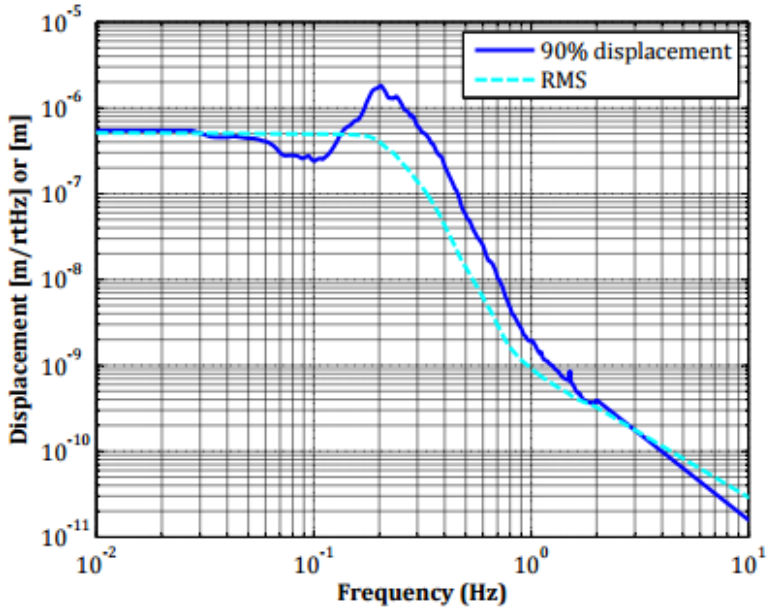


Figure 1: The high-level seismic displacement in Kamioka.

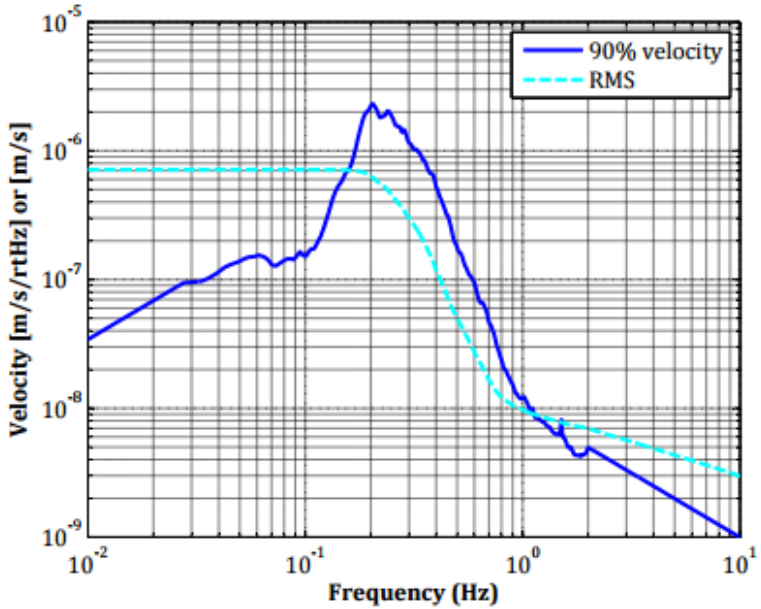
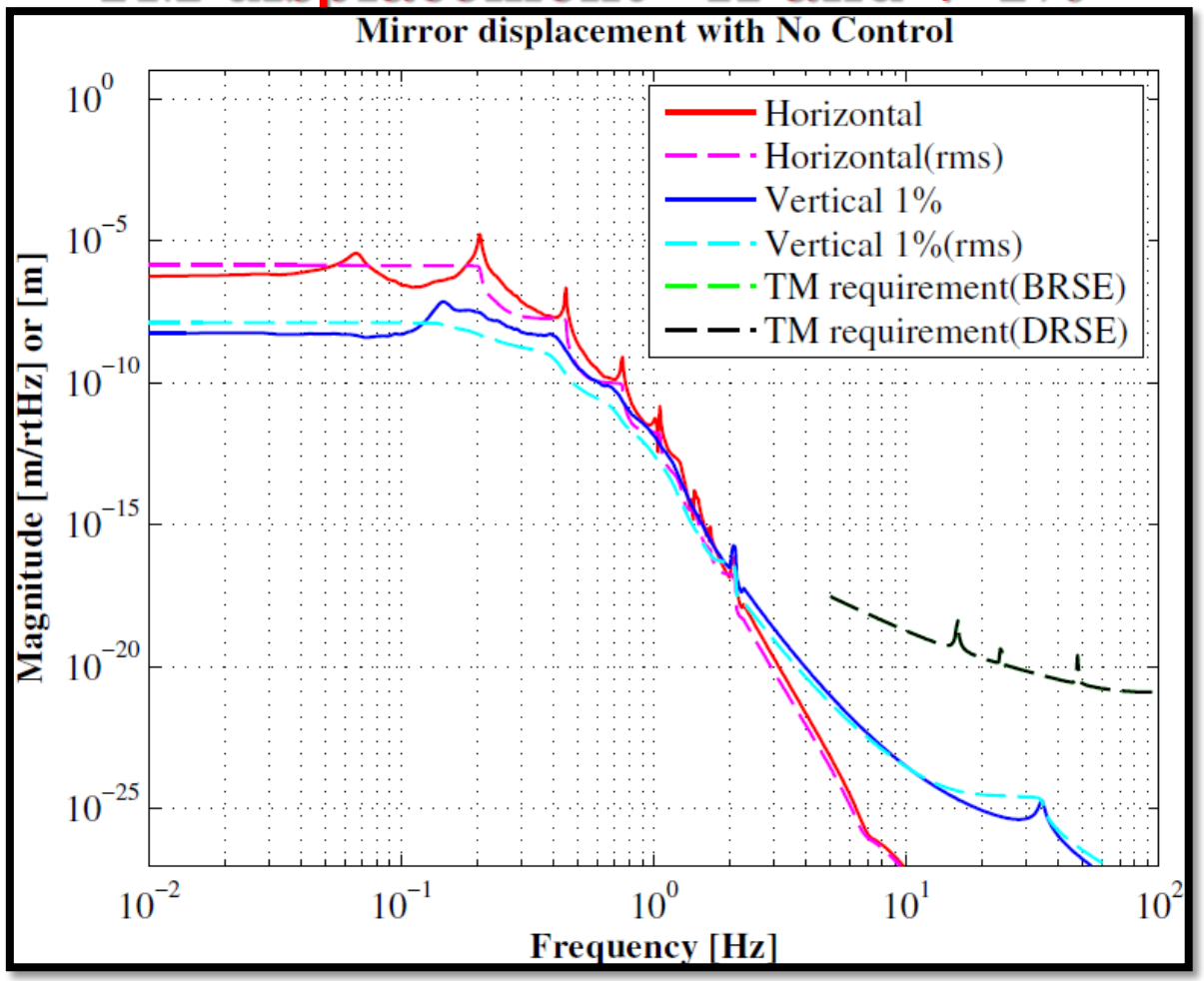


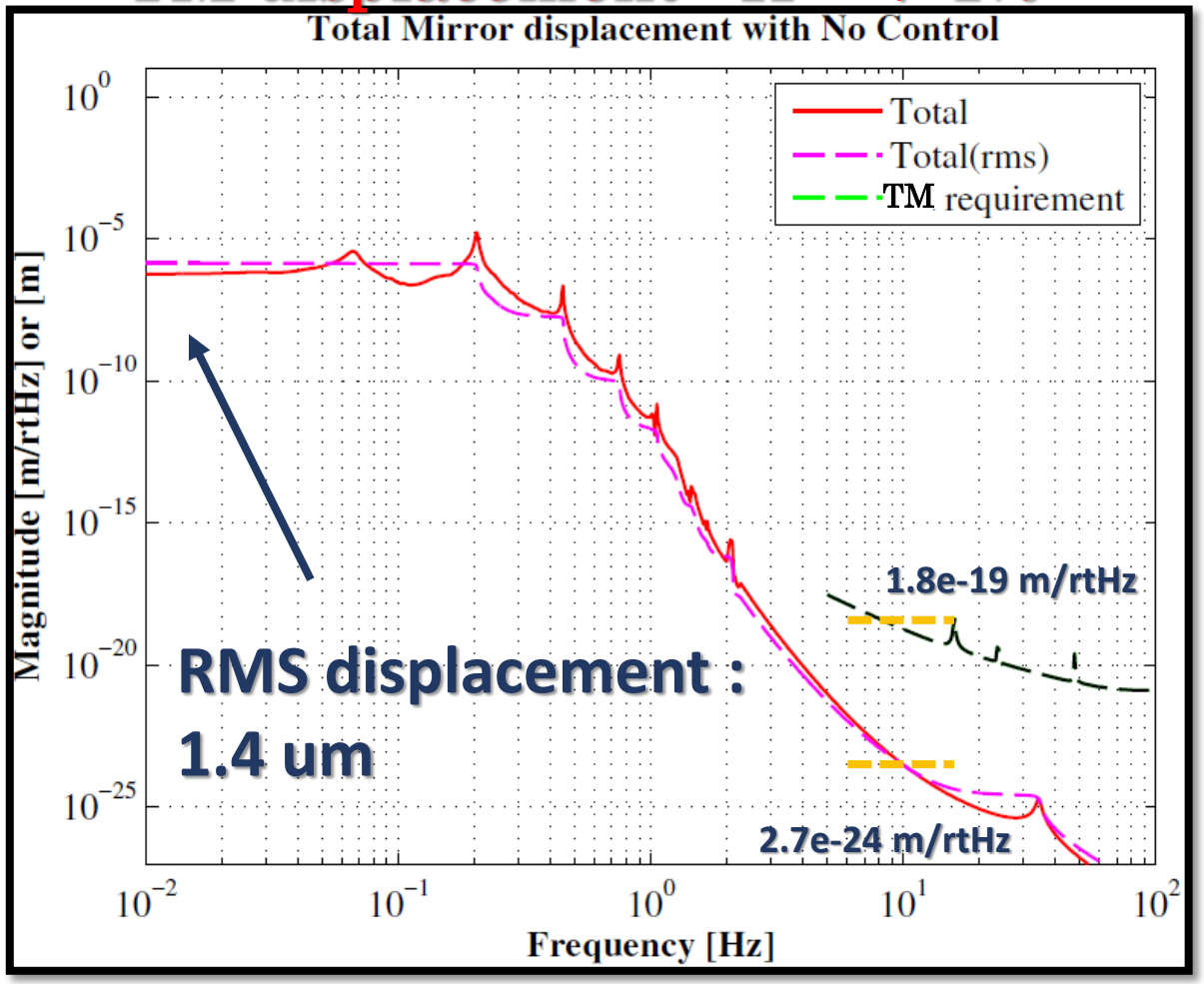
Figure 2: The high-level seismic velocity in Kamioka.

Spectra without ctrl

TM displacement : H and V 1%



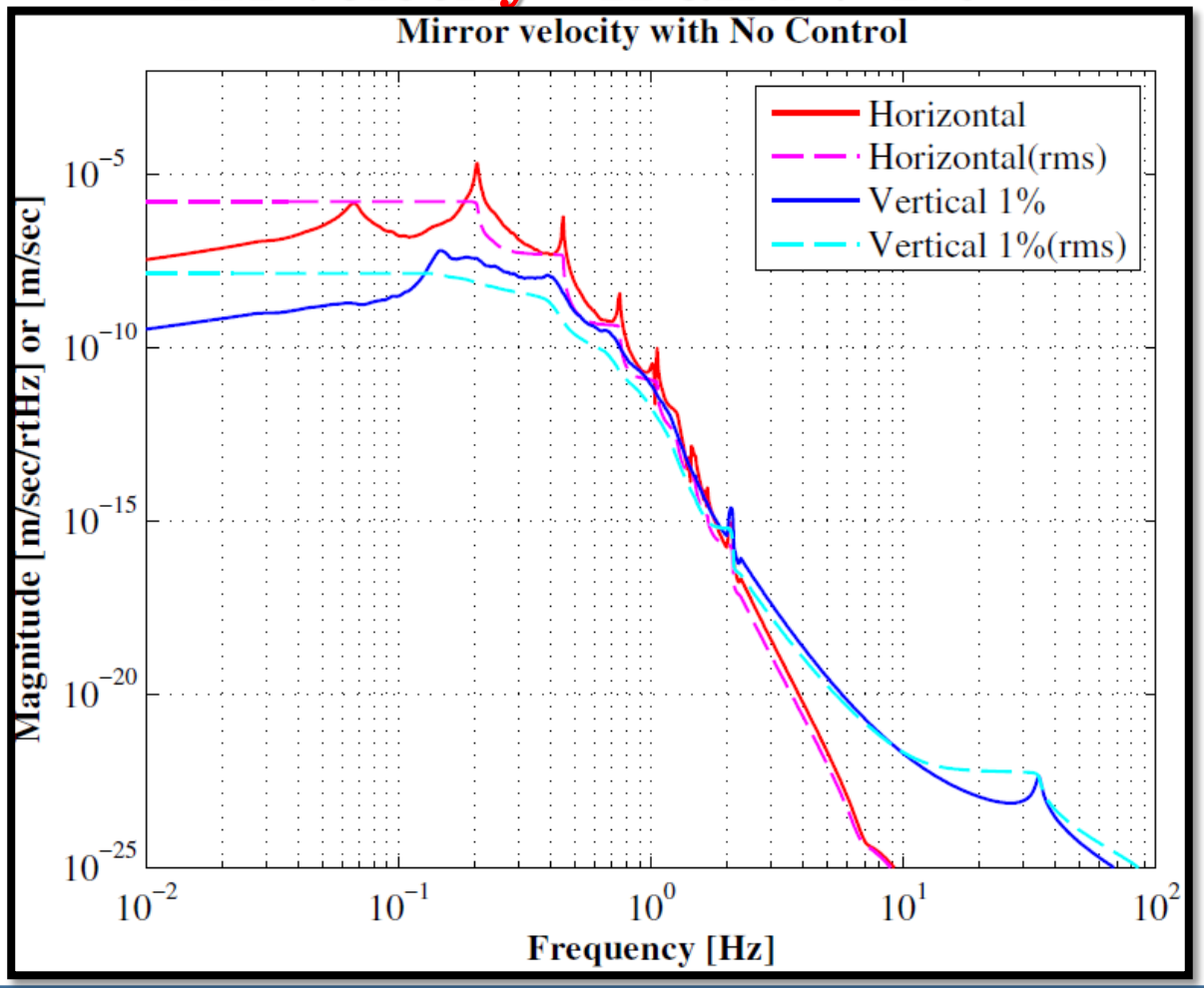
TM displacement : H + V 1%



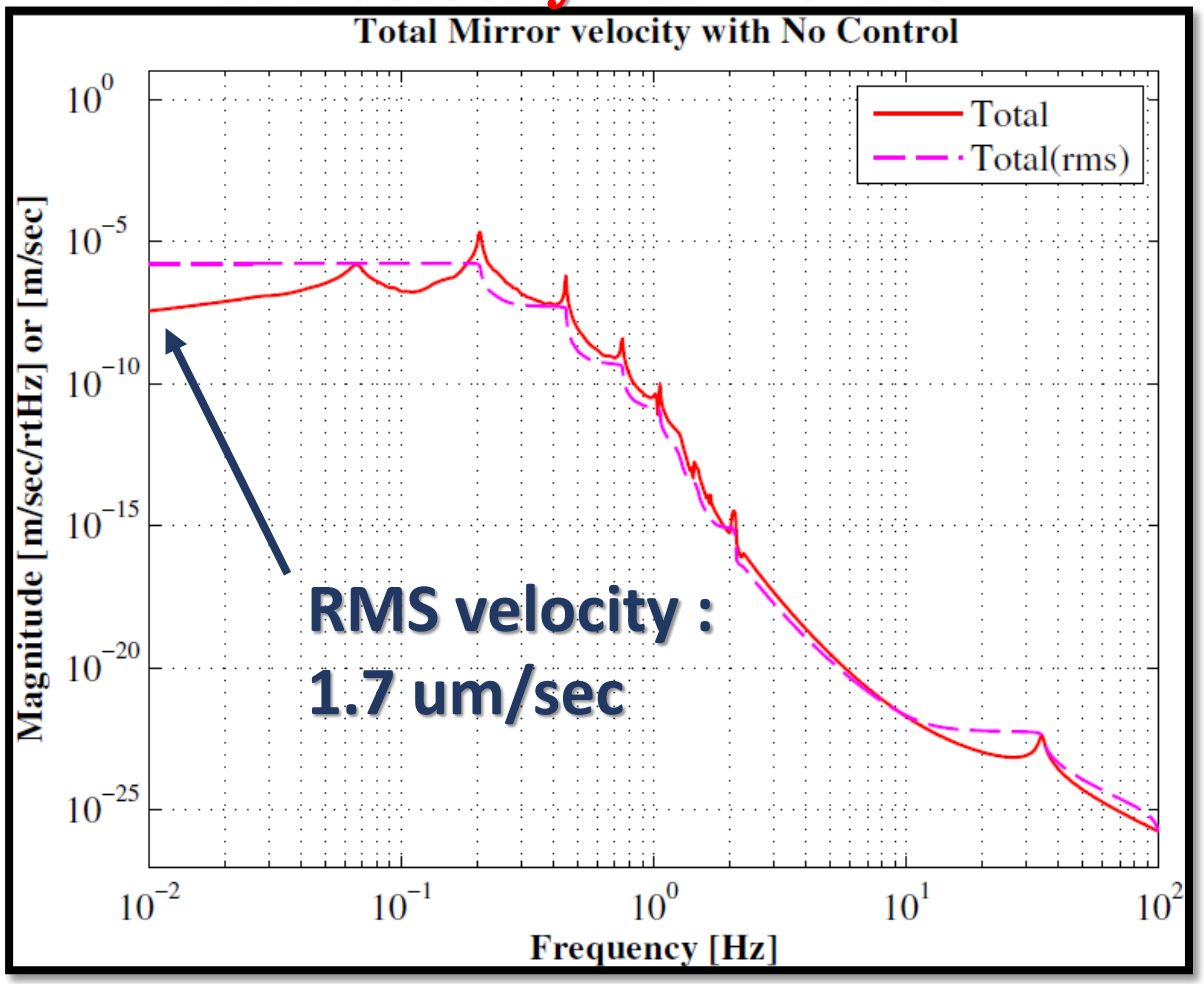
Spectra without ctrl

TypeBp with IP

TM velocity : H and V 1%

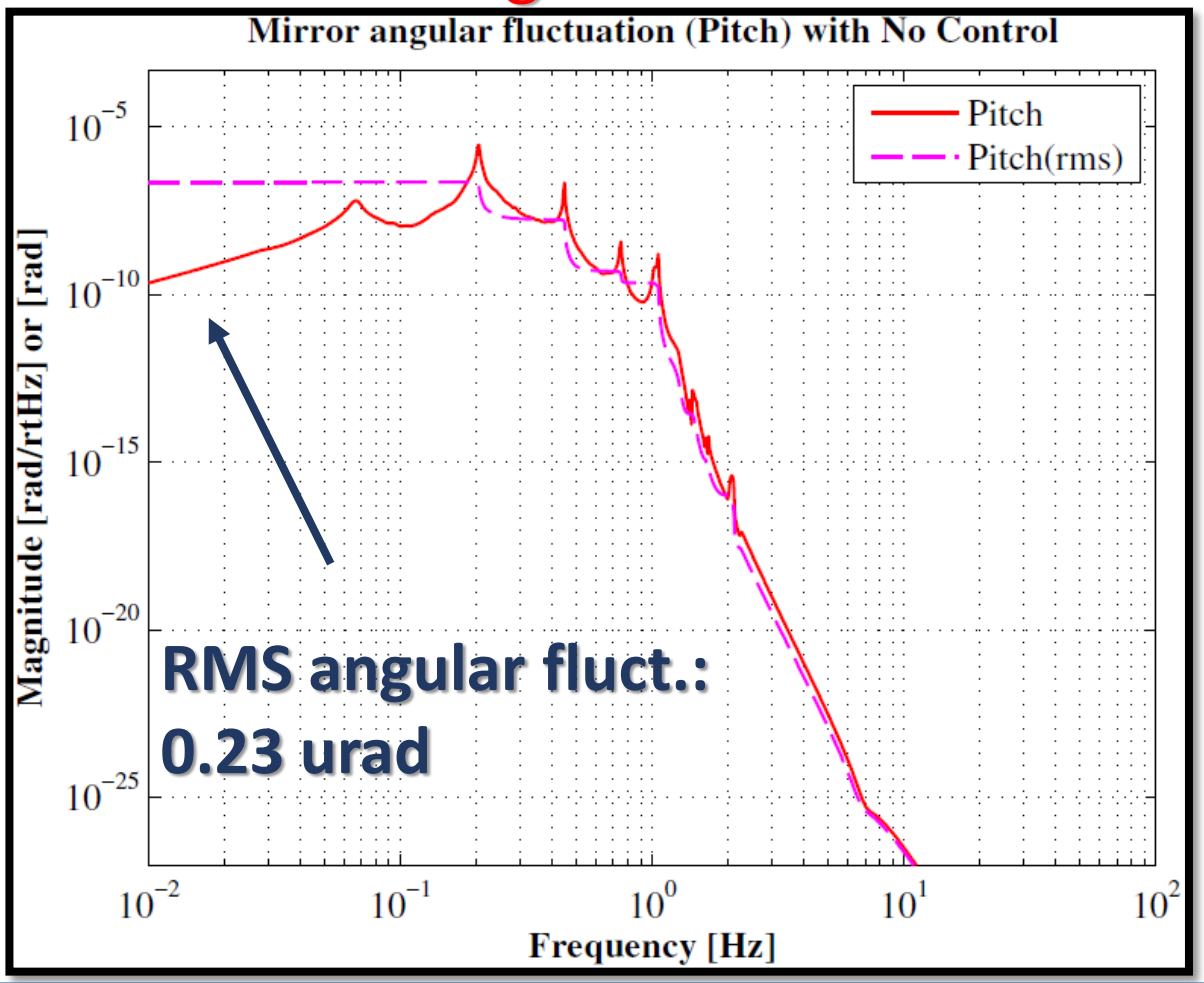


TM velocity : H + V 1%



Spectra without ctrl

TM Pitch Angular fluctuation



TM Pitch fluctuation excited by Longitudinal GND motion

Spectra without ctrl

Control Simulation Results

Filter shape

OLTF

CLTF

Q factor in damping control

Impulse response