IM Calculation

The current default IM calculations are: PGA, PGV, CAV, AI, Ds575, Ds595, MMI, pSA, IESDR

The default periods pSA is calculated at are: 0.02, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 0.75, 1.0, 2.0, 3.0, 4.0, 5.0, 7.5, 10.0

This can be extended into a logspace from 0.01 to 10 at 100 steps in base 10

An intermediate range of periods is to be determined for use in Seistech for UHS / empirical calculations

Intensity Measure	Status	Notes
PGA/PGV/MMI		
pSA		Cython - works well
CAV		
AI		
Ds		Very Slow / unvectorised
Advanced IMs		Current implemented models: SAC_Steel_MF_9Story, SAC_Steel_MF_3Story, Steel_MF_5Story To be implemented models:
Taghavi and Miranda (TM05)		Proposed IM name is TM05_aX_cY_Ts_storeyL_calc X is alpha, Y is C, T is the period and I is the story specified. a = 0, 1.5, 5, 15, 30 c = 0.02, 0.05, 0.1 T = 0.1, 0.4, 0.7, 1.5, 3.0 calculations are disp_peak, slope_peak, storey_shear_peak, and total_accel_peak. In total there will be 3300 IMs calculated for a single waveform. This will be considered as an advanced IM.
Fourier Spectra		Added, vectorised, but quite slow
Directionality (via SA RotD100 /RotD50)		https://uceqeng.slack.com/files/U0C0T55F0/FR5BF7VAP/burks_validationofgmsimsusingsimpleproxies_bssa_2014.pdf https://slack-files.com/T0C0R97U5-FSBQH2RJB-5511f81cef – Boore NonGMmeasuresGMs_BSSA_2010 Added
Ratio of elastic spectra to inelastic spectra		Same paper as above Matlab scripts received from Jack Baker, inelastic script ported to python and validated against the matlab script. Integrated into the workflow, IM names are IESDR_{period} where the same periods for pSA are used. Vahid's test script (relying on python version) and the integrated workflow produce the consistent output.
period-to-period SA correlations		Future work (how do we validate with empirical)
Evolutionary IMs (Rezain et al 2015) (Evolution of intensity; Zero-level upcrossings, positive min & negative max)		https://uceqeng.slack.com/files/U0C0T55F0/FRZA3H51C/rezaeian_validationgmsimulationsusingevolutionaryims_bssa_2015.pdf (low priority; but noted here for completeness)