Calibration and reconstruction in time-series of strain signal of gravitational wave detectors

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In operation of laser interferometric gravitational wave detectors that are a linear transducer system for gravitational waves, we have to reconstruct the strain signal of space-time metric from a output of electric signal of interferometer servo signal. In many past works, the strain signal reconstruction have done in frequency domain using Fast Fourier Transform. However, Calibration in frequency domain needs to divide detector signal with finite time chunks.

For various gravitational wave signal search and evaluation of noise characteristics, we must calibrate signal each analysis method of needing another time chunks. For the more general purpose of the data analysis study, we propose calibration method in time domain by designing time series filter. By this method, We can get infinite time series calibration signal and take without having to worry about time chunks of analysis method.

We will display a analytical framework of the time series filter for the calibration and display numerical processing of CLIO and TAMA observational data.