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加速度型地震計から得た速度と変位の誤差評価について
Error estimates of velocities and displacements from accelerographs

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Strong motion accelerographs have been deployed worldwide to monitor the ground shaking of the Earth and the recorded accelerograms have been used to recover the velocities and displacements by integration. In spite of their fundamental importance in seismology and earthquake engineering, few works address the error estimates of the derived velocities and displacements. We show that the error estimates of the velocities and displacements obtained from accelerograms in the earthquake literature approach to zero as the sampling interval of accelerographs tends to zero; these are erroneous from the statistical point of view. As a result, we present a set of formulae to correctly estimate the errors (or variances) of the integrated velocities and displacements from accelerograms. In addition, we also derive the covariances between the velocities and displacements.

For more details, see Xu (2012, Geophys J Int, doi: 10.1111/j.1365-246X.2011.05354.x).