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Analysis of Gravitational Signals from Core-Collapse Supernovae (CCSNe) using MatLab[1] NOAH FRERE, ANTHONY MEZZACAPPA, KONSTANTIN YAKUNIN, Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996-1200, USA — When a massive star runs out of fuel, it collapses under its own weight and rebounds in a powerful supernova explosion, sending, among other things, ripples through space-time, known as gravitational waves (GWs).GWscan be detected by earth-based observatories, such as the Laser Interferometer Gravitational-Wave Observatory (LIGO). Observers must compare the data from GW detectors with theoretical waveforms inorder to confirm that the detection of a GW signal from a particular source has occurred. GW predictions for core collapse supernovae (CCSNe) rely on computer simulations. The UTK/ORNL astrophysics group has performed such simulations. Here, I analyze the resulting waveforms, using Matlab, to generate their Fourier transforms, short-time Fourier transforms, energy spectra, evolution of frequencies, and frequency maxima. One product will be a Matlab interface for analyzing and comparing GW predictions based on data from future simulations.This interface will make it easier to analyze waveforms and to share the results with the GW astrophysics community.

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