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Modulated surface waves in horizontally vibrated containers J.M. VEGA, UPM Madrid, Spain, F. VARAS, U. Vigo, Spain — Faraday waves excited by horizontal vibrations of a container may show interesting spatio-temporal behaviors, including spatially modulated waves at large aspect ratios. When the vibrating lateral walls extend down to the bottom of the container, the system exhibits an oscillatory bulk flow in a region around these walls of size comparable to the depth of the liquid. This oscillating bulk flow produces subharmonic instabilities if the vibrating acceleration excess a threshold value. Two systems of amplitude equations are derived to describe the evolution of harmonic and subharmonic waves in the combined limit of small viscosity, small wave steepness, and large depth (compared with the wavelength of the surface waves). Further simplifications occur depending on the relative values of the modulation length, the viscous length, and the horizontal size of the container. The amplitude equations are used to analyze the linear stability of the simplest steady states and to elucidate the dominant behavior. Harmonic waves dominate when the viscous length is of the order of the size of the container, and subharmonic waves dominate when the size is much larger.

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