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Modulating frequency and amplitude of biological oscillators

Both frequency and amplitude modulations (FM & AM) are crucial to information processing and functions realization in real physical, chemical and even biological systems. In this talk, a simple but rigorous approach is developed to modulate an oscillator, either in the frequency or in the amplitude domain. The proposed approach is first applied to the normal form undergoing the supercritical Hopf bifurcation where analytical formulations to modulate frequencies and amplitudes are obtained. To demonstrate the applicability of the proposed approach, both FM and AM for the FitzHugh-Nagumo model are designed.