Thursday • January 5, 2024 • 5p.m.–6p.m.
Moscone Center South, Room 207

Natural System Management: A Mathematician's Perspective

Mathematical modeling can represent the population dynamics of a variety of natural systems. Specific management features can be included directly into the model framework, and model outcomes can suggest the need for external actions further affecting the environment. Models with discrete and continuous time steps, and some spatial features will be presented. In one example, optimal control techniques to design time-varying harvest rates of anchovy stock will be illustrated in a food chain system of differential equations for the Turkish coast of the Black Sea, using landing data. In another example, we find the relationship between air temperature and the emergence success of hatchlings across multiple nesting seasons to better understand the potential impact of climate change on loggerhead sea turtle populations. We demonstrate the effect of changing hatchling emergence success on the juvenile and adult populations using a combination of a statistical model and a discrete time model (with two time scales).

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The AMS Council established the Josiah Willard Gibbs Lectureship in 1923, making it one of the society's oldest and most prestigious lectures. Gibbs (1839–1903), a mathematical physicist, was one of the greatest scientists America has ever produced. This invited lecture is popular in nature, directed at those who are not professional mathematicians and intended to make the public aware of the contribution that mathematics is making to present-day thinking and modern civilization.

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