

1135-A0-3257

Stephen Hobbs*, Space and Naval Warfare Systems Center, San Diego, CA. *Using Navy carriers for disaster relief, and the remarkable Hilbert space.*

In this talk I will discuss an optimization problem that arises when a Navy ship is tasked with airlifting supplies to an area that has been struck by a natural disaster. In such a situation hundreds, perhaps thousands, of lives may depend on the speed of delivery. The solution will highlight Hilbert space methods, and in the process of setting up the problem, I will point out some of the numerous uses of Hilbert space methods in modern engineering. Among the most important properties that Hilbert spaces possess for these applications are: projections (for solutions of many types of least squares estimation problems), the Riesz representation theorem (for solutions to many important elliptic boundary value problems), compact operators (for solutions of parabolic and hyperbolic equations), the Fourier transform (for frequency domain processing and analysis of almost all signals in modern communication systems), and reproducing kernels (which are finding a rapidly expanding number of applications in machine learning, automated systems, statistics, and big data). I hope this discussion promotes the inclusion of some of these results and methods, as well as some of their applications, in the graduate curriculum. (Received October 18, 2017)