Engineering Management, Information, and Systems

Seminar Series

Research Seminar

A Chance Constrained Programming Framework to Handle Uncertainties in Radiation Therapy Treatment Planning

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Abstract: Radiation therapy is a non-invasive treatment modality for cancer patients. Radiation therapy treatment planning for cancer patients provides many challenging optimization problems. In this talk, I will introduce a chance-constrained programming (CCP) framework for radiation therapy treatment planning taking into account uncertainties that are associated with patients as well as the device to deliver radiation. For the cases that the probability distribution of the random radiation dose contribution is not completely specified, but is only known to belong to a given class of distributions, an explicit convex condition is provided that guarantees the satisfaction of the probabilistic treatment planning constraints for any realization of the distribution within the given class. This novel perspective gives an insight into the trade-off between sufficient tumor coverage and sparing the healthy tissues under uncertainty, while allowing users to develop an appropriate plan for the treatment. This is a joint work with MD Anderson Cancer Center, Houston, TX.

Biography: Gino Lim is Professor and Chairman, and Hari and Anjali faculty fellow, in the Department of Industrial Engineering at the University of Houston (UH). He is a fellow of IISE. His research interests are in robust optimization, large-scale optimization models and computational algorithms, Operations Research applications in healthcare, power systems, homeland security, and network resiliency. He has published well over 100 research articles and have directed numerous funded research projects over $10M. He received multiple awards from INFORMS including the Pierskalla Best Paper Award, Moving Spirit Award, and Volunteer Service Award. He has also received the Best Paper Award in the IISE energy systems division.
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