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A Dynamic Booking and Overbooking Control Problem for a Two-Leg Airlines Network with Cancellations

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Abstract.

This study explores a difficult maximization problem for the airlines network revenue management. In the settting customers are allowed to cancel their bookings and the cancelled tickets are refundable. Intending to examine the monotonicity of the optimal dynamic booking control, we analyze a two-leg airlines network where customers are characterized by non-homogeneous Poisson flows, and the booked customers will drop out individually prior to the departure at a time-dependent rate. This study reveals that the optimal booking and overbooking controls are monotone and characterized by the *minimum acceptable fares* (MAF) of different itineraries. This study also discusses the optimal overbooking and its related problem allocating appropritate seats to itineraries. It proposes a constant overbooking control and confirms it actually includes all the dynamic and static overbooking controls. Despite the curse of dimensionality leads to intractability of the optimal controls, the study suggests by numerical examples that the heuristics can be designed based on the monotone properties.

Key words: Yield management, seat inventory control, group demand or reservation, minimum acceptable fare (MAF), Poisson demand, choice model, value at risk, certainty equivalent approach.

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