

A railway revenue management problem

A railway company sells tickets for a train going from city A (Napoli) to city B (Milano). During the route the train makes three intermediate stops: Roma, Firenze, Bologna.

The sales prices of the tickets for each Origin-Destination (O-D) are set by the company and depend only by distance. In particular prices in Euros (assume only one class) to each O_i-D_j covered by train are reported in Table .

	Napoli	Roma	Firenze	Bologna	Milano
Napoli	-	45	72	80	100
Roma	-	-	45	59	91
Firenze	-	-	-	25	53
Bologna	-	-	-	-	42

Table 1: Ticket prices for O-D's

At the beginning of the reservation period effective demand for each O_i-D_j is uncertain, but it is known a forecast demand, which mean value is reported in Table .

Assume that the effective demand for each O_i-D_j will be at least the mean value μ_{ij} of the demand. The number of seats available on the train for the class is 700.

	Napoli	Roma	Firenze	Bologna	Milano
Napoli	-	420	355	335	480
Roma	-	-	150	200	375
Firenze	-	-	-	250	300
Bologna	-	-	-	-	160

Table 2: Mean value μ_{ij} of forecast demand

Find the *booking limit*(= number of seats to be sold) for each O-D pair (ij) served by the train, such that the overall expected revenue is maximized.

References

- [1] A. Ciancimino, L.Palagi, G. Inzerillo, S. Lucidi (1998), A mathematical programming approach for the solution of the railway yield management problem, Transportation Science, 33, pp. 168-181, 1998.