Our brief description here glosses over many details and decisions involved in a conjoint study: for example, whether to do pairwise comparison of attributes or full profiles; whether respondents should rate their preferences (say, on a scale of 1 to 10) or rank-order profiles (first choice, second choice, and so on). The interested reader should consult the references at the end of this chapter for such details.

11.1.2.2 RM Product Design Model

As mentioned, few firms currently utilize models to design their RM products. Nevertheless, it is conceptually useful to formulate the problem as an optimization problem to understand the many factors that impact product design.

Consider designing a set of K RM products for one particular resource with a capacity of C.[4] RM products are distinguished by the restrictions. Let there be M bases of restrictions (such as advance-purchase restrictions, min-stay, max-stay (see Table 11.3)). For each basis, there are multiple possibilities for creating a restriction. For example, for the advance-purchase basis, a RM product can use a restriction of three-day advance-purchase, seven-day advance-purchase and so on, or none at all. A RM product is composed of a set of restrictions, one along each basis.

Let $\mathcal{K}$ represent a collection of sets, with each set being a combination of M restrictions. Our design problem is then to pick K sets of restrictions from $\mathcal{K}$, fix prices for the K products, and in addition, decide on the portion $u_k, k = 1, \ldots, K$ of the capacity C to allocate to each of the K products (representing RM capacity controls).

$\mathcal{K}$, of course, could grow exponentially with the number of bases and the number of potential restriction values along each basis. In practice the number of bases would be small, and the number of values along each bases, four or five; hence, the size of $\mathcal{K}$ would be within reasonable limits.

The M bases and their values can be represented in an M-dimensional space. The potential restriction values create a grid in this M dimensional space with each block in the grid representing a potential product. Figure 11.1 gives an example of a 2-dimensional grid representing the product space with the advance-purchase and max-stay segmentation bases.

Let there be N customers. Each customer i has a set of valuations for the products in $\mathcal{K}$, This valuation could be represented by v_{ij}—

[4] K is considered an exogenous number fixed a priori by the firm. Alternatively, K could be an endogenous decision variable and we could model a fixed cost for introducing each additional product.