

Note that it might be possible to determine more precisely the boundaries of the noted subdomain. However, within the framework of this book, we will assume that the subdomain has boundaries outlined in the formulated statement because they correspond to our intuition and allow us to build a workable criterion that enables separation of the CSCs that are expedient to use for evaluation of the functional effectiveness. In view of the previous discussion it is clear that the formulated statement is, in fact, the criterion with which we are concerned, namely, use of a complex search characteristic for evaluation of the functional effectiveness is expedient if the domain of applicability of this characteristic includes the determining square (Figure 10.3), and it is not expedient otherwise. In the following discussion, the complex search characteristics whose domains of applicability include the determining square will be called pragmatically justified.

As we take up the discussion of the determination of limits for the domains of applicability of specific CSCs, we must emphasize that this is important not only in using the formal method for evaluating functional effectiveness but also for information science in general. The authors, unfortunately, cannot offer a formalized method for solving this problem. The principal tools for the solution of this problem apparently are experience with using a specific complex search characteristic in the evaluation of functional effectiveness, a thorough analysis of specific situations involving the evaluation of functional effectiveness, and empirical verification of hypotheses arising during the evaluation process. Therefore, it is not surprising that the boundaries under discussion are quite fuzzy; for this reason any concrete definition of the boundaries of the domain of applicability is tentative, and particular care should be exercised when deciding which points near the assumed boundaries should be included in the domain of applicability of a complex search characteristic. Besides, any proposed boundaries of domain of applicability can be prone to criticism. In spite of this, for certain complex search characteristics, we will indicate boundaries of domain of applicability that we see as justified (with the reservations we make). Such domain boundaries are shown in Figure 10.4 for the complex search characteristic  $I_1 = R + P$  (the lines restricting the considered domain of applicability are clear from the figure).

In determining the boundaries of a CSC domain of applicability, particular attention should be paid to those points that have values under 0.5 on the  $P$ -axis of coordinates. This is in connection to the somewhat negative view of search results with precision less than 0.5. In our opinion, this negative view has certain objective grounds, which we explain as follows. The number of documents that were not identified correctly during the search (using notation in the conjugate table in Figure 10.1) is equal to  $b + l$  ( $b$  is the number of nonretrieved pertinent documents, and  $l$  is the number of retrieved nonpertinent documents). If  $P < 0.5$ , then  $r/(r + l) < 0.5$ , or  $l > r$ . It follows from this that with  $P$  below 0.5,  $b + l > b + r = C$ , meaning that the number of documents that were not identified correctly during search exceeds the number of pertinent documents

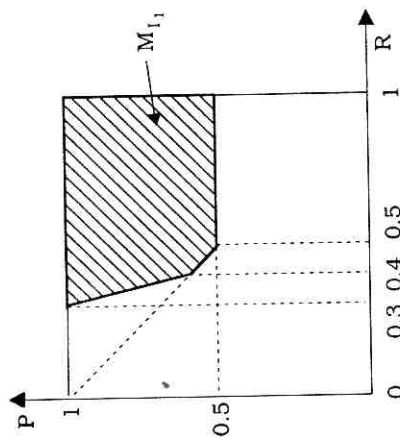


Figure 10.4

The domain of applicability of the complex search characteristic  $I_1 = R + P$ .

in the search collection. Possibly, this is an implicit cause of a somewhat negative view of the results of such a search.

Further, we will discuss the boundaries of the domain of applicability of the complex search characteristic  $I_2 = \sqrt{R \cdot P}$ . (This characteristic will be discussed in more detail later on in this book.) We think it is justified to assume that the boundaries of the domain of applicability of the characteristic  $I_2$  are limited by lines:  $R = 1$ ,  $P = 0.5$ ,  $P = 1$ , and  $R \cdot P = 0.01$  (Figure 10.5); maybe the last line could be better specified by the equation  $R \cdot P = \beta$ , where  $\beta$  is a constant of less than 0.01.

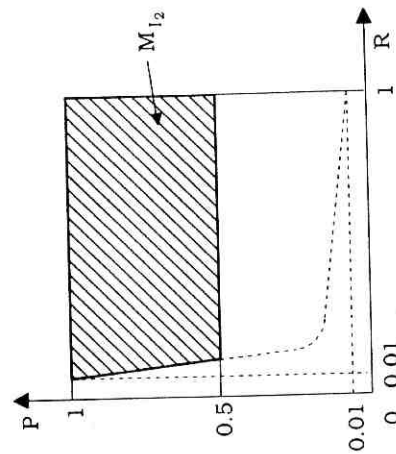


Figure 10.5

The domain of applicability of the complex search characteristic  $I_2 = \sqrt{R \cdot P}$ .