FORECASTING MODELS
INFORMATION-PRESERVING PROCESSES IN THE FORECASTING OF DISTRIBUTION MATRICES

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During the past several decades, regional planning has been evolving from an unstructured heuristic process into an organized, relatively sophisticated set of procedures. During this evolution, many forecasting models have been developed and applied to provide the basic informational support for rational planning decisions. In many cases, these models could be characterized as mechanisms suitable for:

1. Analyzing base-year data sets in order to determine classification systems for distributing the treated entities into exclusive groups that reflect significant (generally behavioral) differences.

2. Quantifying these differences in the form of preferences or resistances, which can be either constants or functions of some other variables.

3. Producing the predicted distribution, generally on the basis of forecasted preferences (or resistances), and constraints given in the form of totals and sub-totals to be achieved by the projected distribution.

The objective of the distribution forecasting process is to provide a matrix of values, which will satisfy the given constraints (assuming they are mutually consistent), with proper regard for the assumed preference or resistance values.

The following simple example of a modal-split forecast will illustrate the basic concepts and the operation of a forecasting model of this type. Assume that equal numbers of trips between two zones are produced by high-income \((h)\) and medium-income \((m)\) households, say 50 trips by each class, and that an estimate is to be made of how many trips are to be made by each of the modes \((a)\) and \((b)\). The high-income group has a preference value \(p^h_a = 1/2\) for mode \((a)\), and \(p^h_b = 3/2\) for mode \((b)\), i.e., the high-income group prefers mode \((b)\) three times as much as \((a)\); the opposite is true for the medium-income group, i.e., \(p^m_a = 3/2\), \(p^m_b = 1/2\).

The preference values will have been derived in the behavioral analysis phase as a function of travel time, cost, and other ratios or differences. The total number of trips is \(t = t_h + t_m = 100\). The input (preferences and constraints) data can therefore be represented as shown below.

<table>
<thead>
<tr>
<th>Mode</th>
<th>(a)</th>
<th>(b)</th>
<th>(t_s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(h)</td>
<td>1/2</td>
<td>3/2</td>
<td>50</td>
</tr>
<tr>
<td>(m)</td>
<td>3/2</td>
<td>1/2</td>
<td>50</td>
</tr>
<tr>
<td>(t_s)</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

* Values in table are preferences; values in the row total column are constraints (trip productions).