TRIANGULATION ADJUSTMENT

The most accurate method is that of least squares but is very complicated since all the angles are simultaneously involved. However, using an approximate method, the adjustment can be achieved by adjusting angles, stations and figures separately. After adjusting the triangulation figure, the sine rule is applied for computing sides. Then the positions of the points are determined by calculating the geodetic coordinates.

ANGLE ADJUSTMENT

Many observations are made for a single angle; for example, face left and face right, vernier A and vernier B, and reading an angle on different parts of the scale. The correction to be applied is directly proportional to the weight and also to the square of the probable error. The angles can be measured with equal or unequal weights. In the former case, the most probable value is the arithmetic mean of the observations, whereas in the latter case, it is the weighted arithmetic mean of the observed angles.

STATION ADJUSTMENT

The station adjustment consists of determining the most probable values of the angles measured at a station so as to satisfy the geometric consistency. The various conditions can be

(i)   closing the horizon,

(ii)   measuring the angles with equal or unequal weights, and

(iii) measuring different angles at a station individually or in combination. In the first case, the error if any is distributed equally to all the three angles. In the second case it is distributed inversely as the respective weights. Whereas in the last case, normal equations are formed and are solved simultaneously.

(iv) FIGURE ADJUSTMENT

(v)   In any system of triangulation, determination of the most probable values of the angles so as to fulfil the geometrical conditions are called figure adjustment. There can be a number of geometrical conditions which the angles should fulfil, but since all the measured angles are affected by errors, they never will meet all the conditions perfectly. Therefore, it is necessary to adjust the angles so as to obtain the best possible and most probable value. The best solution can be obtained by the method of least squares, also known as the rigid method, which is a little complex and therefore, the adjustments are usually done by an approximate method. The geometrical figures encountered in triangulation are a triangle, a quadrilateral or a polygon with a central station.

(vi)   ADJUSTMENT OF A TRIANGLE

(vii)   A triangle is the basic figure of any triangulation system. All the three angles of a triangle are adjusted. Some of the rules for applying corrections to the observed angles are as follows. Let

(viii)   A, B, C = angles of the triangle

(ix)   n = number of observations for an angle

(x)   w = weight of the angle

(xi)   d = discrepancy (error of closure)

(xii)   c = correction to observed angle