An elevation difference accuracy, b, is computed from a minimally constrained, correctly weighted, least square adjustment by:

**b = S/√(d)**

where

**d** = approximate horizontal distance in kilometers between control point positions traced along existing level routes.



**S** = propagated standard deviation of elevation difference in millimeters between survey points obtained from a least squares adjustment. Note that the units of b are **(mm)/ √ (km).**

Correctly weighted means that prior knowledge of the accuracy of points is applied in their weighting.

For an example of designing a check survey (selecting an order and class), assume that a survey is to be designed to check a map which is intended to posses a planimetric (horizontal) "limiting rms error" (see Table 1 of the map standard) of one foot and a contour interval of two feet. In contrast to survey accuracies, which are stated in terms of relative horizontal distances to adjacent points, map features are intended to posses accuracies relative to all other points, map features are intended to possess accuracies relative to all other points appearing on the map. Therefore, for purposes of the check survey, the distance between survey points (d) is taken as the diagonal distance on the ground across the area covered by the map. According to the "FGCC survey standards this is the distance across which the "minimum distance accuracy" and "maximum elevation difference accuracy" are required (see Table 2.1 and 2.2 of the [FGCC, 1984] document.

For the planimetric check survey, assume that the diagonal distance on the ground covered by the map is 6,000 feet. The propagated standard deviation (s) required for the check survey is one-third of the limiting rms error of one foot or 0.33 foot in this example. Returning to the equation from the FGCC [1984] document relating distance between survey points (d), standard deviation (s) and distance accuracy denominator (a):

**a = d/s = (6000 feet)/0/33 feet) = 18,182**

By referring to Table 2.1 of the FGCC document, it is clear that a control survey designed according to the standards and specifications for second–order, class II is required to