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LGC: Analysis and practical example of direct levelling observations referenced on the CERN local Geoid model

Direct levelling is performed extensively in the CERN surveying processes for accelerator elements' alignment and positioning. LGC software (Logiciel Général de Compensation) computes results and associated statistics for observations used by surveyors. Traditionally, direct levelling campaigns are computed separately from the planimetry, using simple differences of height -called in LGC *DVER observation- between two measured points.*

*LGC provides another observation model, called*DLEV, using offsets to a horizontal plane at the position of the station. The level planimetric position must therefore be known or be computable by additional observations. This more rigorous model allows a better integration in 3D computation involving other instruments, such as laser trackers or total stations.

This article reviews the traditional method and analyses the use of geo-referenced levelling stations for accelerator element surveying. The influence of the station planimetric position precision and of the Geoid model used are studied and illustrated with a practical case.

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Track Classification: Survey & Alignment