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An Object Oriented Approach to Processing Accelerator Alignment Measurements

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Over a long period of time the least squares compensation program at CERN, LGC, has been gradually re-written in C++. Part of the program has been integrated into a software library, which is also used in a number of other programs, with the functionality specific to LGC built on top. The geodetic transformations used within the program have been updated and a sparse matrix representation added for the least squares matrix, this latter change contributing, in part, to a significant increase in the calculation speed.

A new version is now nearing completion, with a necessary change to the input data format allowing for the inclusion of measurements from a non-levelled theodolite or laser tracker. The observation equations used within the program have also been revised where appropriate, to increase the programs flexibility, and these new formulations have added unknown lines and planes to the parameters to be determined. Some of these new observation equations will be presented, together with the anticipated advantages they provide.

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