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AUTOMATIC EXTRACTION OF ROCK JOINTS FROM LASER SCANNED DATA BY MOVING LEAST SQUARES METHOD AND FUZZY K-MEANS CLUSTERING

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Abstract. Recent development of laser scanning device increased the capability of representing rock outcrop in a very high resolution. Accurate 3D point cloud model with rock joint information can help geologist to estimate stability of rock slope on-site or off-site. An automatic plane extraction method was developed by computing normal directions and grouping them in similar direction. Point normal was calculated by moving least squares (MLS) method considering every point within a given distance to minimize error to the fitting plane. Normal directions were classified into a number of dominating clusters by fuzzy K-means clustering. Region growing approach was exploited to discriminate joints in a point cloud. Overall procedure was applied to point cloud with about 120,000 points, and successfully extracted joints with joint information. The extraction procedure was implemented to minimize number of input parameters and to construct plane information into the existing point cloud for less redundancy and high usability of the point cloud itself.

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