

COMPRESSING TERRAIN ELEVATION DATASETS

By

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ABSTRACT

A novel compression scheme named Overdetermined Compression (ODETCOM) for 16 bit Digital Elevation Models (DEMs) is proposed. We achieve excellent lossless compression ratios, surpassing the competing image compression algorithms like variants of JPEG (JPEG-LS and JPEG 2000). We also achieve a very competitive near-lossless (lossy with error bounds) compression, often surpassing the compression of JPEG-LS by a large margin.

ODETCOM is based on a causal template model. We use a novel approach to train our model. An overdetermined system of linear equations is used to compute our model's parameters. We minimize the second norm of the residual to strike a balance between the conflicting predictor requirements. The error between the prediction and the sample value is compressed. Using our method we manage to achieve compression rates consistently better than the lossless JPEG variants.