Title: MEI - A Morphologic Element Interpolator
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Abstract:

The analytic element method is used to interpolate geologic morphology. A potential is associated with the elevation of a geologic surface.
It is not necessary that the potential obey a particular governing differential equation, only that it have a morphology that can represent some part of the observed surface. A limited number of functions are implemented.

Line functions are particularly useful because they allow a geologist to add information about expected linear trends to the model. Line functions can be used to build a trend model that uses up only a few of the available degrees of freedom; differences from the trend model and the observations appear as residuals and inform the geologist of mistakes in the interpretation. A new divergent line-integral is introduced to simulate line features with continuous slope.

An application is presented for interpolating the bedrock surface and the litho logic layering in eastern Dakota County from boring logs. A trend surface is attempted by placing line functions along ridges, valleys, and fault lines. The trend model is refined until the surface looks reasonable against the observation data and geologic interpretation. Results are presented using the open-source viewer gilliAEM.