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Abstracts of Short Communications and Posters

Section:

8. Analysis

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Catenaria vera - the true catenary.
The problem of describing the shape of an ideal chain under the sole influence of an inverse square law of central gravitational force admits an explicit and unique solution for any physically admissible initial data. This opens a way to prove that these solutions do actually minimize potential energy. For the corresponding upright arches two special cases occur, where the curves are segments of hyperbolic and logarithmic spirals, respectively. Numerical simulations show for which dimensions of chains and arches the difference from the classical catenary becomes significant. It turns out that in some cases even the parabola is a better approximation for the true catenary than the hyperbolic cosine.