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Exact solutions describing soliton-like interactions in a string

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The paper derives the equations of motion for a straight elastic string that deforms in space by bending and twisting. The motion of such string is governed by coupled nonlinear partial differential equations. We solve these equations exactly in terms of a vibron soliton (VS). Vibrational structure of solutions and soliton-like interactions are examined. The deformation propagates along the string without change of form, and deviates from a plane, having a 3D structure with the increase of the torsion. For a vanishing torsion we obtain the shape of the string called the elastica and illustrated in the Love's book.