

RECURRENCE EQUATION FOR A DETERMINATION OF THE GENERALISED STRETCH FUNCTION

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A stretch function quantifying molecular length after deformation is expressed through the full solid angle integral of the absolute value of deformed unit vector. Square of the stretch function represents the deformation energy of an elastomer and enables a derivation of the universal strain tensor in the Doi-Edwards model. Unlike the classical stretch function, a generalised one is characterized by an arbitrary power of the unit vector in integrand. For instance, in the Partial Strand Extension model an increase in molecular length after deformation and retraction is evaluated by the generalised stretch function with the power under the integral equal to 0.5. The aim of this contribution is to derive a recurrence equation for this function (with no restrictions on the values attained by the power). This recurrence equation is solved asymptotically. Based on the asymptotic solution, there is found an approximate expression for the generalised stretch function in terms of strain invariants.

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