

Exact solutions of directed lattice path problems related to colloidal dispersions: some combinatorics and some physics

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We present the exact solutions of various directed walk models of polymers confined to a slit and interacting with the walls of the slit via an attractive potential. Apart from the general interest in the effect of geometrical confinement this can be viewed as a two-dimensional model of steric stabilization and sensitized flocculation of colloidal dispersions. We demonstrate that the large width limit admits a phase diagram that is markedly different from the one found in a half-plane geometry, even when the polymer is constrained to be fixed at both ends on one wall. While we concentrate on the long chain limit we shall also discuss some preliminary results, in particular a scaling ansatz, for finite lengths.