

Wall and Boundary Free Energies

II. General Domains and Complete Boundaries

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Abstract. The asymptotic free energy of a planar wall with potentials W , cut in scalar spin systems, with ferromagnetic interactions K , enclosed in general domains subject to reasonable shape conditions, is shown (under conditions used in Part I) to exist and to be equal to the unique limiting wall free energy, $f_{\times}(K, W)$, of simple rectangular or box domains. Similar results are found for sets of walls forming the complete boundaries of domains; for “subfree” walls the total free energy of a box domain is proved to be asymptotically equal to a bulk plus a uniquely-defined surface term. Some limited results for periodic boundary conditions are reported.

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1 This paper is written as a direct continuation of Part I [Fisher, M. E., Caginalp, G.: Commun. math. Phys. 56, 11–56 (1977)]. Accordingly the numbering of sections, equations, and figures runs straight on from Part I [which contained Sects. 0 to 4, Eqs. (0.1) to (4.4.23), and Figs. 1 to 9]