

**Dauge, Monique; Djurdjevic, Ivica; Rössle, Andreas**

**Full asymptotic expansions for thin elastic free plates.** (English. Abridged French version)

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C. R. Acad. Sci., Paris, Sér. I, Math. 326, No. 10, 1243-1248 (1998).

**Summary:** We investigate a linearly elastic plate with free boundary conditions on the lateral sides as the half-thickness  $\varepsilon$  tends to zero. As for hardly clamped plates, the leading term of the asymptotic expansion of the scaled displacement is a Kirchhoff-Love field with in-plane generating functions satisfying classical bending and membrane problems of Neumann type. The first boundary layer profile is of bending type, so that in the case of a membrane load the convergence of the three-dimensional solution to the two-dimensional limit is of improved accuracy. Conditions under which the asymptotic expansion ‘starts later’ are given, and the structure of the first non-vanishing term is studied.

**MSC:**

[74K20](#) Plates  
[35Q72](#) Other PDE from mechanics (MSC2000)  
[35C20](#) Asymptotic expansions of solutions to PDEs

Cited in **2** Documents

**Keywords:**

leading term of asymptotic expansion; convergence of three-dimensional solution to two-dimensional limit; free boundary conditions; Kirchhoff-Love field; in-plane generating functions; boundary layer; membrane load

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