The Dirichlet problem for the slab with entire data and a difference equation for harmonic functions

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Abstract. It is shown that the Dirichlet problem for the slab $(a, b) \times \mathbb{R}^d$ with entire boundary data has an entire solution. The proof is based on a generalized Schwarz reflection principle. Moreover, it is shown that for a given entire harmonic function g the inhomogeneous difference equation $h(t + 1, y) - h(t, y) = g(t, y)$ has an entire harmonic solution h.