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	id	id7826100916615804451	**abstract**	This paper establishes isomorphisms for the Laplace operator in weighted Sobolev spaces (WSS). These spaces are similar to standard Sobolev spaces, but they are endowed with weights prescribing functions growth or decay at infinity. Although well established in the whole space, these weighted results do not apply in the specific hypothesis of periodicity. This kind of problem appears when studying singularly perturbed domains (roughness, sieves, porous media, etc). When zooming on a single perturbation pattern, one often ends with a periodic problem set on an infinite strip. We present a unified framework that enables a systematic treatment of such problems. We provide existence and uniqueness of solutions in our WSS. This gives a refined description of solutions behavior at infinity which is of importance in the mutli-scale context. These isomorphism results hold for any weight exponent and any regularity index. We then identify these solutions with the convolution of a Green function (specific to periodical infinite strips) and the given data. This identification is valid again for any weight and any regularity index modulo some harmonic polynomials.		
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