

Shift-invariant subspaces of Sobolev spaces and wave fronts

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Abstract. We proceed with the study of shift-invariant spaces of Sobolev type [1, 2] analyzing products of their elements and connections with wave fronts [3]. The research was inspired by Hormander's description of wave fronts [4] and the paper [5]. Using the Fourier transform, we investigate the connection between shift-invariant subspaces V_s of Sobolev spaces $H^s(\mathbb{R}^d)$, $s \in \mathbb{R}$, and the space of periodic distributions, and we analyze the product of elements of those spaces using the wave fronts of Sobolev type. We also give conditions under which the product of two functions from two different shift-invariant spaces belongs to some shift-invariant space. Also, using the wave front we describe the elements of the space V_s and the elements of the space of periodic tempered distributions.

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Keywords: shift-invariant spaces; Sobolev spaces; multiplication of distributions; periodic distributions; wave fronts.

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