Levi-Civita Symbol in Hilbert Space L2

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Hilbert's space is a complete unitary space that allows you to operate with complex n-tics (vectors), complex sequences and complex functions in exactly the same way. The basic element of this space is the operation of a dot product. The dot product allows you to count the size of Hilbert's elements and, together with them, the angle between any two elements of this space. The only missing element in Hilbert's theory is the presence of a vector. The operation of the vector is defined by the Levi-Civita symbol only for complex n-tics, resulting in a vector which is perpendicular to (n-1) vectors in the n-dimensional space. In a simple way, it can also be generalized to the area of complex sequences. How, however, to generalize the Levi-Civita symbol on the function space, where the indexes of the elements of the Hilbert space are continuous? It would be necessary to create a function that would carry all the properties of the Levi-Civita symbol, which would make it possible to generalize the cross product even in the function space. The result of this work is the extension of the Hilbert space L2 (M) to the operation of the vector of two functions, as well as the determination of the operator, which assigns the function perpendicular to the function. This mathematical apparatus can be applied to various fields of mathematics, but also to physics. We believe that the results of this work are useful in the theory of integral equations, functional series and in quantum theory.