AN ORTHOGONAL TRIGONOMETRIC SCHAUDER BASIS FOR THE SPACE $C(\mathbb{T}^2)$

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This talk is based on a joint research with Prof. Dr. Jürgen Prestin (Institute of Mathematics, University of Luebeck) and Dr. Vitalii Myroniuk (Institute of Mathematics of NAS of Ukraine).

We construct an orthogonal trigonometric Schauder basis in the space $C(\mathbb{T}^2)$ of continuous periodic on $\mathbb{R}^2$ functions. Further for this basis we use a notation $\{t_k, k \in \mathbb{N}\}$. Our results generalize the one-dimensional construction that is based on the kernel of de la Vallée Poussin [1]. The polynomial degree is considered in terms of the l_1 - and l_∞ -norm.

To construct this basis we use ideas of a dyadic anisotropic periodic multiresolution analysis (PMRA) and corresponding wavelet spaces that were developed in [2] and [3]. The set of dilation matrices for the two-scale relation of two spaces of the PMRA contains only rotation matrices.

For a function $f \in C(\mathbb{T}^2)$ and $\mu \in \mathbb{N}$ we define the operator

$$S_\mu f = \sum_{k=1}^{\mu} \langle f, t_k \rangle t_k,$$

where $\langle f, t_k \rangle$ are the Fourier coefficients of a function f with respect to the basis $\{t_k, k \in \mathbb{N}\}$. The main result is the estimation of the norm $\|S_\mu\|_{C(\mathbb{T}^2) \to C(\mathbb{T}^2)}$.

1. *Prestin J., Selig K. K.* On a constructive representation of an orthogonal trigonometric Schauder basis for $C_{2\pi}$ // Oper. Theory, Adv. Appl., Birkhäuser, Basel. – 2001. – Vol. 121. – P. 402-425.
2. *Langemann D., Prestin J.* Multivariate periodic wavelet analysis // Appl. Comput. Harm. Anal. – 2010. – Vol. 28. – P. 46–66.
3. *Bergmann R., Prestin J.* Multivariate periodic wavelets of de la Vallée Poussin type // J. Fourier Anal. Appl. – 2015. – Vol. 21. – P. 342–369.

ПРО ДЕЯКИЙ ОРТОГОНАЛЬНИЙ ТРИГОНОМЕТРИЧНИЙ БАЗИС ШАУДЕРА У ПРОСТОРІ $C(\mathbb{T}^2)$

На базі звичайної двовимірної тригонометричної системи сконструйовано нову поліноміальну ортогональну систему, яка, як показано, є базисом Шаудера у просторі $C(\mathbb{T}^2)$ неперервних періодичних на $\mathbb{R}^2$ функцій.