

ГОДИШНИК НА СОФИЙСКИЯ УНИВЕРСИТЕТ „СВ. КЛИМЕНТ ОХРИДСКИ“

ФАКУЛТЕТ ПО МАТЕМАТИКА И ИНФОРМАТИКА

Том 97

ANNUAIRE DE L'UNIVERSITE DE SOFIA „ST. KLIMENT OHRIDSKI“

FACULTE DE MATHEMATIQUES ET INFORMATIQUE

Tome 97

---

CONNECTION BETWEEN THE LOWER  $p$ -FRAME CONDITION  
AND EXISTENCE OF RECONSTRUCTION FORMULAS  
IN A BANACH SPACE AND ITS DUAL

DIANA T. STOEVA

In the present paper it is proved that under an additional assumption (which is automatically satisfied in case  $p = 2$ ) validity of the lower  $p$ -frame condition for a sequence  $\{g_i\} \subset X^*$  implies that for  $f$  in a subset of  $X$  there exists a representation  $f = \sum g_i(f)f_i$ , where  $\{f_i\} \subset X$  satisfies the upper  $q$ -frame condition,  $\frac{1}{q} + \frac{1}{p} = 1$ . An example showing that the above representation is not necessarily valid for all  $f$  in  $X$  (neither reconstruction formula of type  $g = \sum g(f_i)g_i$  for all  $g \in X^*$ ) is given. It is shown that when  $\mathcal{D}(U)$  is dense in  $X$ ,  $g \in X^*$  can be represented as  $g = \sum g(f_i)g_i$  if and only if  $\sum g(f_i)g_i$  converges.

**Keywords:**  $p$ -frames, lower bound, reconstructions, Banach spaces, dual spaces

**2000 MSC:** 42C15, 40A05

*Received November 1, 2003*

*Revised April 15, 2004*

Department of Mathematics  
University of Architecture, Civil Engineering and Geodesy  
1, Christo Smirnenski blvd.  
1046 Sofia  
BULGARIA  
E-mail: stoeva\_fte@uacg.bg