

# Hamiltonicity/Non-Hamiltonicity of 2-Block-Intersection Graphs of Twofold Triple Systems

Aras Erzurumluođlu

Department of Mathematics and Statistics

Memorial University of Newfoundland

St. John's, NL, Canada A1C 5S7

aerzurumluog@mun.ca

A *balanced incomplete block design* (BIBD( $v, k, \lambda$ ))  $(V, \mathcal{B})$  is a combinatorial design in which (i)  $|V| = v$ , (ii) for each block  $B \in \mathcal{B}$ ,  $|B| = k$ , and (iii) each 2-subset of  $V$  occurs in precisely  $\lambda$  blocks of  $\mathcal{B}$ . A BIBD( $v, 3, 2$ ) is a *twofold triple system* (TTS( $v$ )).

Given a combinatorial design  $\mathcal{D}$  with block set  $\mathcal{B}$ , the *block-intersection graph* (BIG) of  $\mathcal{D}$  is the graph having  $\mathcal{B}$  as its vertex set, and in which two vertices  $B_1 \in \mathcal{B}$  and  $B_2 \in \mathcal{B}$  are adjacent if and only if  $|B_1 \cap B_2| \neq 0$ . Similarly, the  *$i$ -block-intersection graph* ( $i$ -BIG) of  $\mathcal{D}$  is the graph having  $\mathcal{B}$  as its vertex set, and in which two vertices  $B_1 \in \mathcal{B}$  and  $B_2 \in \mathcal{B}$  are adjacent if and only if  $|B_1 \cap B_2| = i$ .

I will present some recent results (from our joint work with David Pike) on the Hamiltonicity/non-Hamiltonicity of 2-BIGs of twofold triple systems.