Chapter 4. Maximum Packings and Minimum Coverings

Study Guide

The following is a brief list of topics covered in Chapter 4 of Lindner and Rodger's *Design Theory* Second Edition, Discrete Mathematics and Its Applications Series, CRC Press (2008). This list is not meant to be comprehensive, but only gives a list of several important topics. You should also carefully study the proofs given in class and the homework problems.

Section 4.1. The General Problem.
"Closeness" to a Steiner triple system, packing K_v, leave of a packing, maximum packing, examples of maximum packings (Example 4.1.1), the leaves of maximum packings with triples (Figure 4.2), covering K_v, multisets, padding of a covering, minimum covering, examples of minimum coverings (Example 4.1.2), the paddings of minimum coverings with triple (Figure 4.4), parallels between packings/coverings and outer/inner measure.

Section 4.2. Maximum Packings.
Classification of maximal packings with triples (Theorem 4.2.A, Notes 4.2.A, 4.2.B, 4.2.C, and Exercises 4.2.4, 4.2.5, 4.2.6, 4.2.7), examples of the constructions Examples 4.2.1, 4.2.2, 4.2.3).

Section 4.3. Minimum Coverings.
Classification of minimal coverings with triples (Theorem 4.3.A, Notes 4.3.A, 4.3.B, 4.3.C, and Exercises 4.3.4, 4.3.5, 4.3.6, 4.3.7), examples of the constructions Examples 4.3.1, 4.3.2, 4.3.3).

Supplement. Packings and Coverings for Mendelsohn and Directed Triple Systems.
Mendelsohn triple, directed triple, Mendelsohn triple system, directed triple system, oriented triangle, packing of D_v, leave, maximum packing, covering of D_v, padding, minimum covering, paddings of a minimum covering (Figure DPC.2), classification of maximum packings with directed/transitive triples (Theorem DPC.A), classification of maximum packings with Mendelsohn triples (Theorem DPC.B), classification of minimum coverings with directed/transitive triples (Theorem DPC.C), classification of minimum coverings with Mednelsohn triples (Theorem DPC.D).

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