

Title: The mathematical theory of juggling

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Abstract: This diploma thesis extends the bachelor thesis of the same name. It deals with the graphic representation of juggling sequences by the cyclic diagram. Using the Burnside theorem and cyclic diagrams, we calculate the number of all generators of juggling sequences. The relation between juggling and the theory of braids is described as well. The mathematical model of inside and outside throws is made from an empirical observation of trajectories of balls. Braids of juggling sequences and their attributes are provided using a real model of ladder. A sketch of the proof of the theorem that any braid is juggleable is given as well.