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Självständigt arbete i matematik

Matematiska institutionen

Stockholms universitet

## Madeleine Leander: On the bunkbed conjecture

Handledare: Svante Linusson

### Sammanfattning

We will study a problem on percolation on product graphs  $\tilde{G} = G \times K_2$ , where  $G$  is a finite graph and  $K_2$  is the graph consisting of two vertices,  $\{0, 1\}$ , and one edge connecting them. On  $\tilde{G}$  consider the percolation model with  $p$  the probability that an edge  $e$  exists, for all  $e \in \tilde{G}$ . All edges in  $\tilde{G}$  will exist independently of each other. We write  $u \leftrightarrow v$  for the event "there is a path from  $u$  to  $v$ ". The bunkbed conjecture states that for any bunkbed graph  $\tilde{G} = G \times K_2$ , corresponding to a finite graph  $G$  the following holds

$$P(u_0 \leftrightarrow v_0) \geq P(u_0 \leftrightarrow v_1),$$

for all  $u, v \in V(G)$  and any probability  $p$ . We prove the bunkbed conjecture for some small classes of graphs.