

## The Possibility of Solving a 3x3 Rubik's Cube under 3 Seconds

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**Abstract :** Rubik's cube was invented in 1974. Since then, speedcubers all over the world try their best to break the world record again and again. The newest record is 3.47 seconds. There are many factors that affect the timing, including turns per second (tps), algorithm, finger trick, hardware of the cube. In this paper, the lower bound of the cube solving time will be discussed using convex optimization. Extended analysis of the world records will be used to understand how to improve the timing. With the understanding of each part of the solving step, the paper suggests a list of speed improvement techniques. Based on the analysis of the world record, there is a high possibility that the 3 seconds mark will be broken soon.

**Keywords :** Rubik's Cube, speed, finger trick, optimization

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