UNIVERSITY of WISCONSIN
UWMILWAUKEE
Department of
Mathematical Sciences

Dissertation Defense

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PhD Student

Under the Supervision of Prof. Hans Volkmer

Friday
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EMS Building
Room E495
9:00am

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God's Number in the Simultaneously-Possible Turn Metric

In 2010 it was found that God's number is 20 in the face turn metric. That is, if the Rubik's cube hasn't been disassembled, it can always be solved in 20 twists or fewer, but sometimes requires 20 twists. However, the face turn metric only allows one face to be turned at a time for a total of 18 generators, or 18 possible twists at any time. This dissertation allows opposing, parallel faces to be twisted at the same time and still get counted as 1 twist for a total of 45 generators. A new optimal-solving program was constructed, and the results so far show that God's number is at least 16 for the simultaneously-possible turn metric.
I note that in 3 dimensions the simultaneously-possible turn metric is the same as the axial turn metric (or robot turn metric), but not in 4 dimensions nor higher (e.g. 2×2×2×2, 3×3×3×3, 4×4×4×4, etc.–not to be confused with the 3-dimensional 4×4×4 cube). This difference is also described.

Committee Members:

Profs. Hans Volkmer (Advisor); Istvan Lauko, Bruce Wade, Jeb Willenbring, & Dexuan Xie

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