Research on mathematical butterfly patterns conducted up to 2013

February 6, 2022 Yuji Masuda
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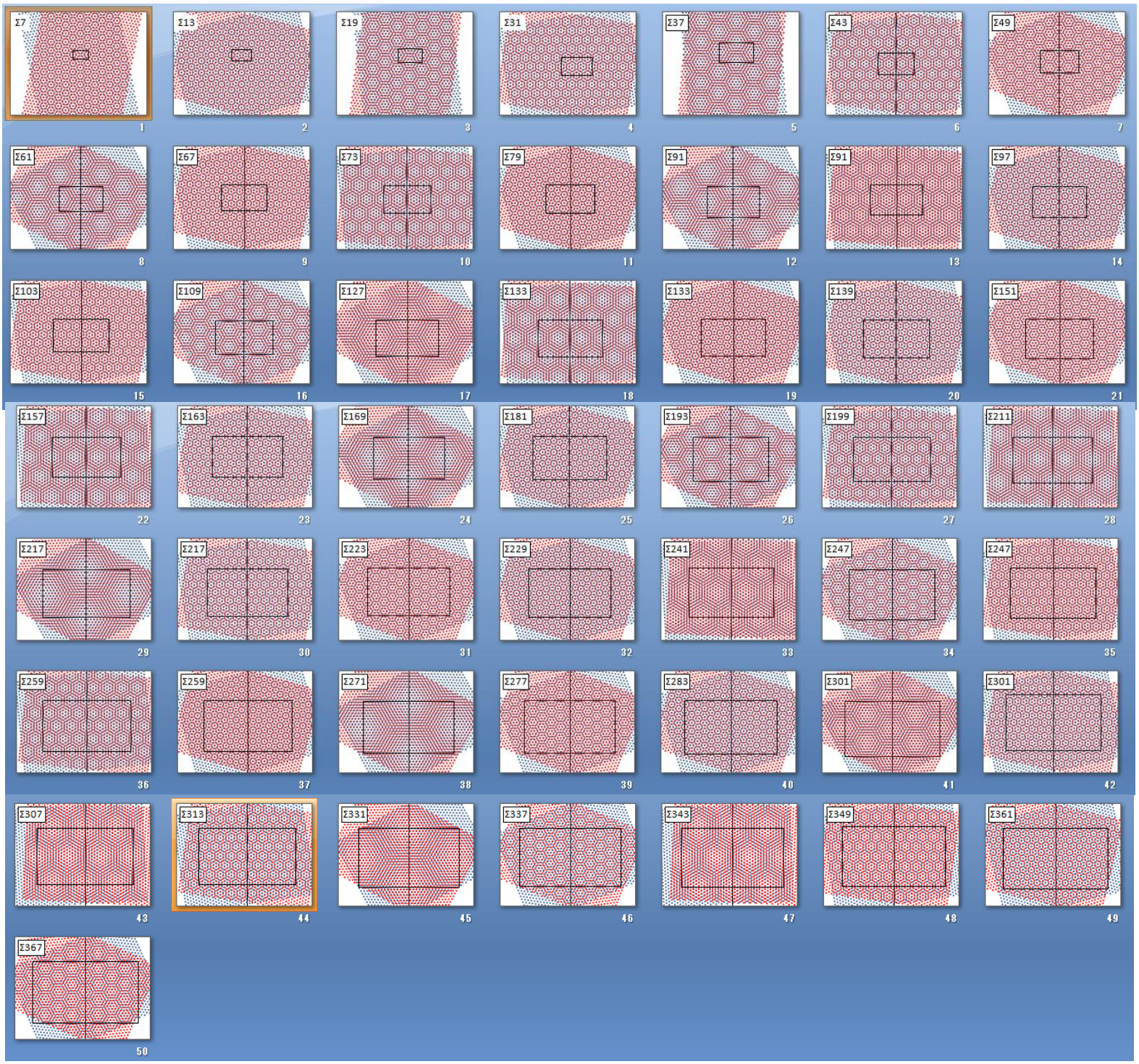
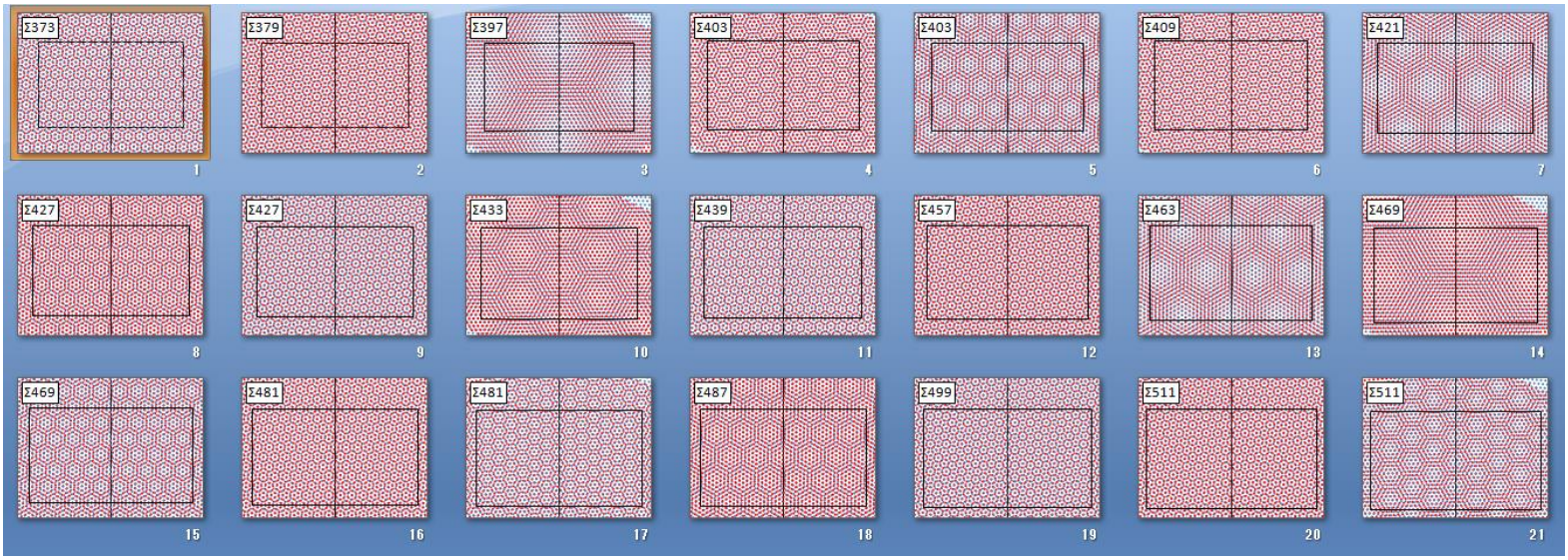
This research is an original development of mine in the field of crystal geometry in metallurgy, which was my research topic as a student.

Abstract

In the study of the deformation mechanism of metallic materials, this structure consisting of two metallic crystals with different crystal orientations, called the corresponding grain boundary, has been evaluated by a parameter called the ∑ value. In addition, it has been pointed out that the DSC (=Displacement of Complete pattern Shift)dislocation model may be affected by up to ∑ value 29 at the corresponding grain boundary.

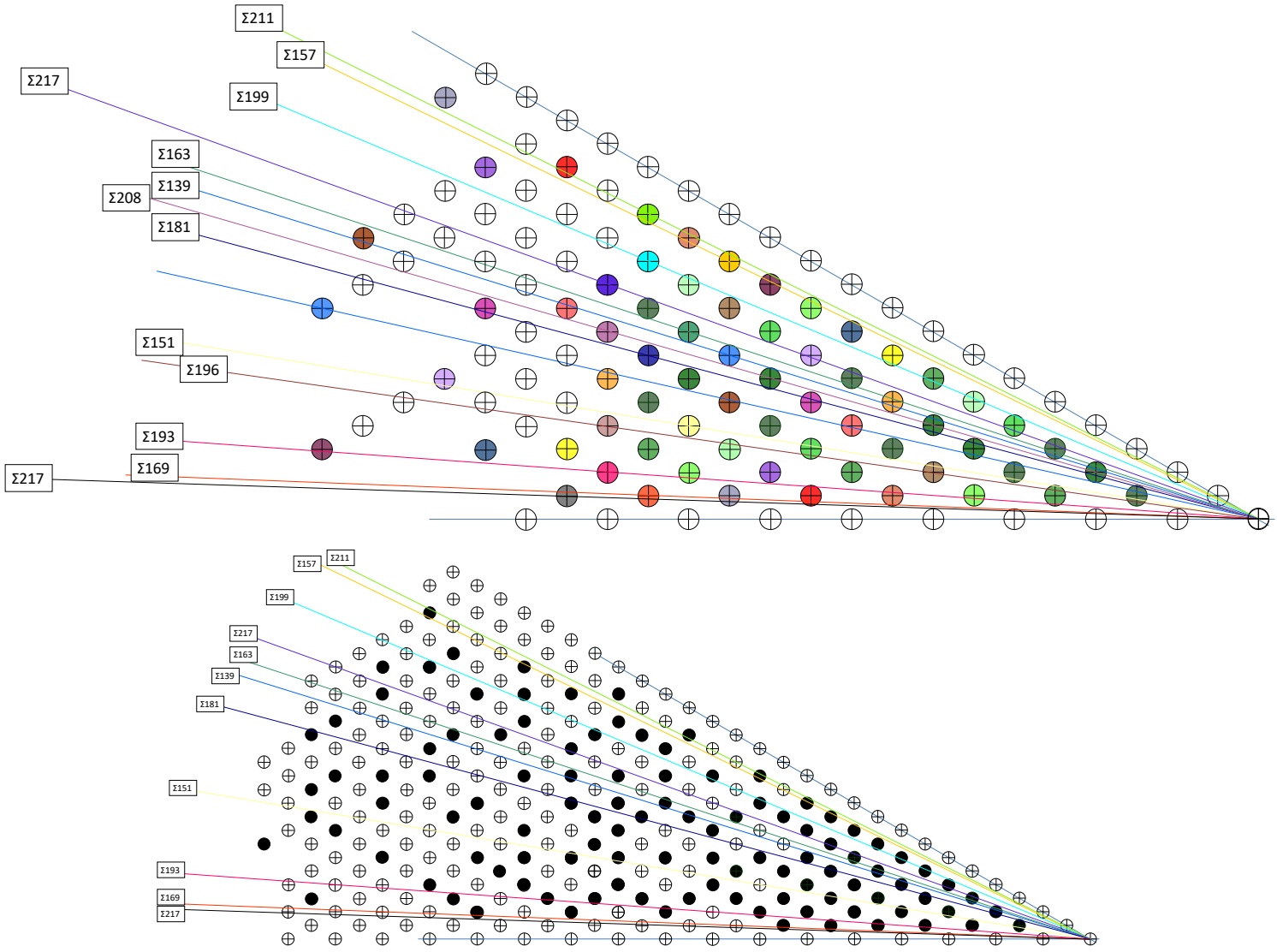
In this paper, we will focus only on the ∑ value, and use only the mathematical point of view.

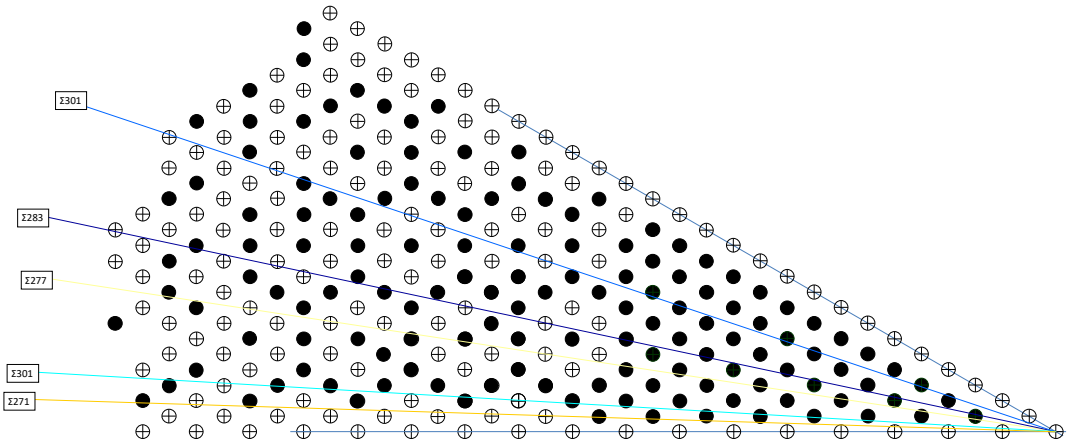




General comment

It was found that the geometric pattern was divided into several patterns depending on the ∑ value. Finally, I would like to conclude with the following diagram of how to calculate the ∑ value. Thank you for reading.

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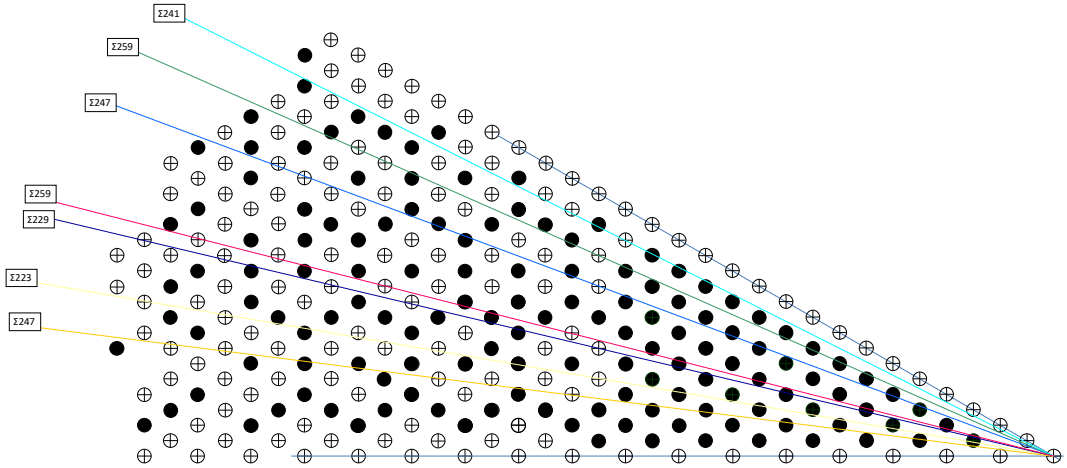
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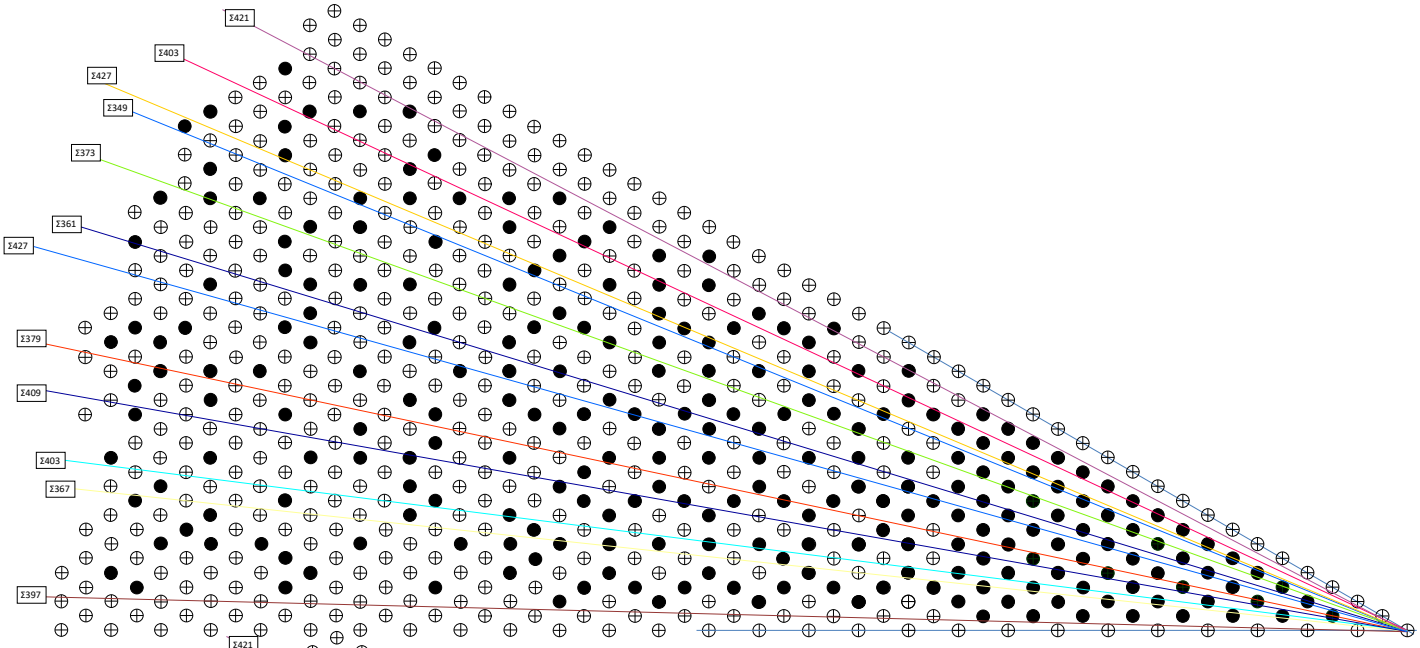
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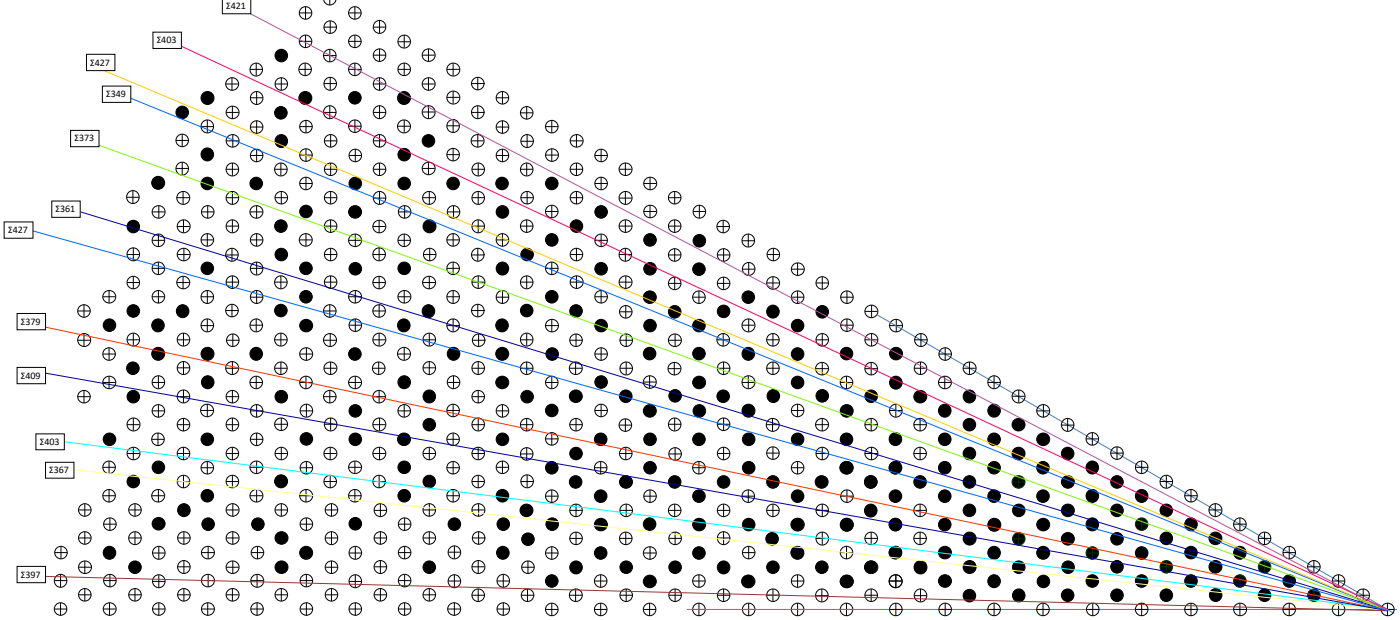
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