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Manuel Lopez* (malsma@rit.edu), School of Mathematical Sciences (COS), Rochester Institute of Technology, 1 Lomb Drive, Rochester, NY 14623. *How the Method of Finite Differences can show you the way to conjectures.*

The *method of finite differences* is well known for problems that yield to a polynomial solution. We will use this method in the more exotic problem of figuring out the i^{th} dimension of \mathbb{Z} -graded rings. Each \mathbb{Z} -graded ring will be a quotient ring of a polynomial ring $k[x_1, x_2, \dots, x_n]$ where k is a field. The solution for this problem turns out to be a difference equation, not a polynomial. The resulting difference equation is readily computable. However the biggest dividend of our approach is the availability of conjectures if one knows how to read the finite difference table. I'll point out the ones I have recognized, but other conjectures might still be there in plain sight. (Received August 30, 2009)