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Vizing's Theorem for Graphings

Vizing's Theorem states that every graph of maximum degree d admits an edge-coloring with at most $d+1$ colors. A graphing is an analytic generalization of a bounded-degree graph that appears in various areas, such as sparse graph limits, orbit equivalence and measurable group theory. We prove that every graphing of maximum degree d admits a *measurable* edge-coloring with $d+1$ colors, assuming a stronger version of Vizing's Theorem. Without this assumption, we can still prove the same with $n + O(\sqrt{n})$ colors, or with $d+1$ colors for bipartite graphs.