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The Proof of a Combinatorial Conjecture of Simion

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Simion presented a conjecture involving the number of paths in a rectangular grid with the Ferrers diagram of a partition of an integer removed. The conjecture, as interpreted by Sagan, predicts the unimodality of a sequence of such numbers where the sum of the length and width of the rectangular grid is constant and the partition is fixed. In an article in Discrete Mathematics, I proved the conjecture in certain cases including where the partition is self-conjugate; subsequently, I proved the conjecture in general and also showed that the sequence is log concave. In this talk, I will discuss the proof of this conjecture and some relatively elementary techniques used in the proof.