Using a new Delta Function Representation, QFT Disconnected Diagrams Evaluate to Zero KENNETH BRAND, United Technologies — When evaluating Quantum Field Theory terms using diagram based perturbation expansions (Feynman Diagrams), those diagrams that have subgraphs that are not connected to incoming or outgoing particles are ignored. There are convincing physical reasons why these particular diagrams should be ignored. However, when the numerical value of a typical such term is evaluated, the calculated value is conventionally divergent. In this paper, these disconnected diagrams are evaluated using a new representation of the Dirac delta function. By constraining the choices of the delta function representations, the value of any QFT disconnected diagram can be made to be precisely zero. This approach gives a mathematical justification for ignoring such terms without having to invoke infinite renormalization.

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