

MultiSet-Venn Analysis

Robert Lloyd Jackson, M.D., Stilwell, Kansas

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Abstract

This paper defines the union and intersection of multiple sets.

$$\delta_{AB}^i = \delta_A^i \delta_B^i$$

$$S_A \cup S_B = \bigcup_{i=1}^n \{\epsilon_i \delta_{A \cup B}^i\}$$

$$\bigcup_j S_{A_j} = \bigcup_{i=1}^n \bigcup_{j=1}^m \{\epsilon_i \delta_{\sum_{a=b} A_{ja} A_{jb} + \sum_{a \neq b} (A_{ja} + A_{jb})}^i\}$$

$$S_A \cap S_B = \bigcap_{i=1}^n \{\epsilon_i \delta_A^i \delta_B^i\}$$

$$S_A \cap S_B = \bigcap_{i=1}^n \{\epsilon_i \delta_{AB}^i\}$$

$$\bigcap_j S_{A_j} = \bigcap_{i=1}^n \bigcap_{j=1}^m \{\epsilon_i \delta_{\prod_j A_j}^i\}$$

The top panel is the Hadamard product of a Kronecker term in Einstein notation. The middle panel is the union of two and multiple sets. Lastly, the bottom panel is the intercept of two and multiple sets.