Characteristic Function

Let A be a set. The **characteristic function** of $\mathrm{B} \subseteq \mathrm{A}$ is the function $\chi_{\mathrm{B}} : \mathrm{A} \to \{0, 1\}$ defined as:

$$\chi_B(a) = \begin{cases} 1 & (a \in B) \\ 0 & (a \in A \setminus B) \end{cases}$$

The **characteristic function of the relation** $\mathrm{R} \subseteq \mathrm{A}_1 \times \cdots \times \mathrm{A}_n$ is the function $\chi_{\mathrm{R}} : \mathrm{A}_1 \times \cdots \times \mathrm{A}_n \to \{0, 1\}$ defined as:

$$\chi_R(a_1, \ldots, a_n) = \begin{cases} 1 & (\langle a_1, \ldots, a_n \rangle \in R) \\ 0 & (\langle a_1, \ldots, a_n \rangle \notin R) \end{cases}$$