Theorem Let $X_i \sim \text{minimax}(\beta, \gamma_i)$ for $i = 1, 2, \ldots, n$ be mutually independent random variables. The minimum of $X_1, X_2, \ldots, X_n$ is also a minimax random variable with parameters β and $\sum_{i=1}^n \gamma_i$.

Proof The cumulative distribution function of a minimax(β, γ) random variable X is given by

$$F_X(x) = 1 - (1 - x^\beta)^\gamma \qquad 0 < x < 1.$$

The cumulative distribution function of $Y = \min\{X_1, X_2, \ldots, X_n\}$ is

$$\begin{aligned}
F_Y(y) &= P(Y \le y) \\
&= 1 - P(Y \ge y) \\
&= 1 - P(\min\{X_1, X_2, \ldots, X_n\} \ge y) \\
&= 1 - P(X_1 \ge y, X_2 \ge y, \ldots, X_n \ge y) \\
&= 1 - P(X_1 \ge y)\, P(X_2 \ge y) \ldots P(X_n \ge y) \\
&= 1 - (1 - y^\beta)^{\gamma_1} (1 - y^\beta)^{\gamma_2} \ldots (1 - y^\beta)^{\gamma_n} \\
&= 1 - (1 - y^\beta)^{\sum_{i=1}^n \gamma_i} \qquad 0 < y < 1,
\end{aligned}$$

which is the cumulative distribution function of a minimax$(\beta, \sum_{i=1}^n \gamma_i)$ random variable.