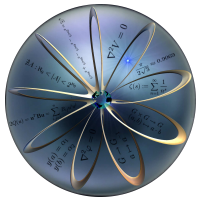

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Cramér-Wold theorem

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Let

$$\overline{X}_n = (X_{n1}, \ldots, X_{nk}) \text{ and } \overline{X} = (X_1, \ldots, X_k)$$

be random vectors. Then $\overline{X}_n$ converges to $\overline{X}$ http://planetmath.org/ConvergenceInDistributi distribution if and only if

$$\sum_{i=1}^{k} t_i X_{ni} \xrightarrow[n\to\infty]{D} \sum_{i=1}^{k} t_i X_i.$$

for each $(t_1, \ldots, t_k) \in \mathbb{R}^k$. That is, if every linear combination of the coordinates of $\overline{X}_n$ converges in distribution to the correspondent linear combination of coordinates of $\overline{X}$.