

Handout 13: Limits

An infinite sequence of random variables X_1, X_2, \dots **converges in distribution** to X if the limits of the cdf functions limit (pointwise) to the cdf of X . That is, for every real number we can show that the limit of the cdf's for X_i at that point limit to the cdf of X . We denote convergence in distribution by $X_i \xrightarrow{d} X$.

In most cases it is difficult to take the limits of cdf functions directly; however we can make use of the mgf in many cases to show that a sequence has a certain limit. The mgf has two important additional properties: (1) if two random variables have equivalent mgf functions, they have the same distributions and (2) if the mgf of an infinite sequence of random variables X_1, X_2, \dots limits pointwise to the mgf of a random variable X , then $X_i \xrightarrow{d} X$.

Limits will become more central when we study continuous random variables in the next unit.