Teorem (lineær kombinasjon av Normal fordelt SV

La $X_1, X_2, \ldots, X_n$ være uavhengige Normal fordelt SV med

$$E(X_i) = \mu_i \text{ og } Var(X_i) = \sigma_i^2 \text{ for } i = 1, \ldots, n$$

La

$$Y = b + a_1 X_1 + a_2 X_2 + \cdots + a_n X_n$$

Da er

$$Y \sim N(\mu_Y, \sigma_Y^2)$$

med

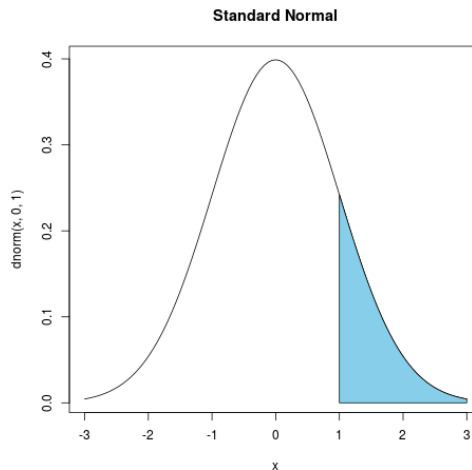$$\mu_Y = b + a_1 \mu_1 + a_2 \mu_2 + \cdots + a_n \mu_n$$

og

$$\sigma_Y^2 = a_1^2 \sigma_1^2 + a_2^2 \sigma_2^2 + \cdots + a_n^2 \sigma_n^2$$

$$P(Z > z_\alpha) = \alpha$$

α	z_α
.2	0.842
.15	1.036
.1	1.282
.075	1.440
.05	1.645
.04	1.751
.03	1.881
.025	1.960
.02	2.054
.01	2.326
.005	2.576
.001	3.090
.0005	3.291
.0001	3.719
.00005	3.891
.00001	4.265
.000005	4.417
.000001	4.753

Standard Normal

Sentralgrense teorem (8.2)

Sentralgrenseteoremet La $X_1, X_2, \ldots, X_n$ være et tilfeldig utvalg fra en fordeling med forventning μ og varians σ^2. Da har vi at sannsynlighetsfordelingen til

$$Z = \frac{\bar{X} - \mu}{\sqrt{\frac{\sigma^2}{n}}}$$

går mot standard normalfordelingen, $N(0, 1)$, når $n \to \infty$.
Merk: Det er det samme som å si at $\bar{X}$ er tilnærmet $N(\mu, \sigma^2)$.

Historisk: Student-T fordeling

- W.S. Gosset (1876-1937) was employed by the Guinness Brewing Company of Dublin.

- Sample sizes available for experimentation in brewing were necessarily small, and Gosset knew that a correct way of dealing with small samples was needed.

- He consulted Karl Pearson (1857-1936) of Universiy College in London about the problem. Pearson told him the current state of knowledge was unsatisfactory.

- The following year Gosset undertook a course of study under Pearson. An outcome of his study was the publication in 1908 of Gosset's paper on "The Probable Error of a Mean," which introduced a form of what later became known as Student's t-distribution.

- Gosset's paper was published under the pseudonym "Student."