**Latent Variable**

A latent variable is a variable which is not directly observable and is assumed to affect the response variables

Latent variable models have now a wide range of applications,

These models are typically classified according to: . nature of the response variables (discrete or continuous) . nature of the latent variables (discrete or continuous) . inclusion or not of individual covariates

**Most well-known latent variable models**

1. Factor analysis model
2. Item Response Theory models
3. Generalized linear mixed models
4. Finite mixture model
5. Latent class model
6. Finite mixture regression model
7. Models for longitudinal data based on state-space
8. Latent Markov models
9. Latent Growth

**A general formulation of latent variable models**

The contexts of application dealt with are those of observation of different response variables at the same occasion (e.g. item responses) . repeated observations of the same response variable at consecutive occasions (longitudinal/panel data); this is related to the multilevel case in which subjects are collected in clusters

1. Case of discrete latent variables (finite mixture model, latent class model)
2. Case of continuous latent variables
3. The Expectation-Maximization (EM) paradigm for maximum likelihood estimation
4. Case of discrete latent variables
5. Latent class and latent regression model
6. Latent regression model

**Factors**

1. Linear factor analysis
2. Maximum likelihood estimation
3. Choice of the number of factors
4. Orthogonal rotation