

Linear recursive systems (LRS) describe linear relationships among continuous random variables (typically, normally distributed ones). Acyclic oriented graphs are used to provide a qualitative description of these relationships. In a different branch of statistics, graphs serve as a means to describe conditional independence (CI) structures in systems of random variables. One of the aims of the thesis is to show that within the class of regular Gaussian distributions, both approaches coincide: for a given acyclic oriented graph, the statistical model of LRS specified by the graph is equivalent to a class of Gaussian distributions with CI structures that accord with the same graph. Furthermore, we generalized some of the relations between a graph of LRS and its CI structure outside the scope of Gaussian distributions. Another focus of the thesis is the relation between the graph of a LRS and the covariances among its variables. We derived a relationship that is analogous to the method of path coefficients which was introduced in the 1920s by the American geneticist Sewall Wright.