# ComputeInterventions

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## 1 Compute Interventions

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This notebook is intended to give you some insight on how to compute intervention distributions. Intervention distributions can be obtained from the observational distribution and the causal graph by so-called *covariate adjustment*, or by direct manipulations of the structural assignments in a structural causal model.

```
In [1]: library(igraph) #comment out this line if you cannot install igraph
        library(CondIndTests)
        library(dHSIC)
        source("./utils.R")
```

```
Attaching package: igraph

The following objects are masked from package:stats:

    decompose, spectrum

The following object is masked from package:base:

    union

Loading required package: nlme
This is mgcv 1.8-17. For overview type 'help("mgcv-package")'.
```

### 1.1 Covariate adjustment

Consider a causal model over variables $\mathbf{X}$ and assume that we are interested in the distribution of $Y \in \mathbf{X}$ under the (atomic) intervention

$$do(X := x)$$

on some other variable $X \in \mathbf{X} \setminus \{Y\}$. This interventional distribution can be computed from the observational distribution and the causal graph by covariate adjustment, also called the G-formula. It says (in case of discrete variables, the integral is replaced by a sum)