

## Exercise 1

### Discrete Phase Type distribution

The owner of an icecream retail store bores herself a rainy Danish day during summer. To spend some time she invents a small exercise with the aim of improving storage management. The exercise is

Only the persons passing as couples (one of each sex) is of interest. The topic considered is how many person or couples who need to pass before one decides to buy an icecream.

- Question 1 Present a probabilistic model for the number of couples, who need to pass before a male who want to buy an icecream passes.
- Question 2 A similar model is applicable for the number of females. Present a model of phase type describing the number of couples who need to pass before one person decides to buy an icecream. Characterize that distribution.
- Question 3 Further it is of interest to consider the number of couples who need to pass before two couples has decided to buy at least one icecream. Deduce a probabilistic model of phase type and characterize the distribution.
- Question 4 Finally the dealer is wondering how many couples will pass before an icecream has been bought by a person of each sex. Deduce a phase type distribution describing this and characterize the distribution.