# Passengers leaving the bus

For this we only looked at the passenger prognosis file.

We assume that the amount of passengers leaving the trams is only dependent on the stop and the time of day. As we do not have information about individual passengers, we decided to model the leaving passengers as a fraction of the total occupancy of the tram at that time.

First off, we note that this fraction is always zero for the first stop and 1 for the last stop (everyone still in the tram should leave at that time)

We then looked at the passenger prognosis file and plotted the estimated amount of leaving passengers per stop against the occupancy of the tram at that time.

For Uithof -> CS:

We excluded the value 1 that was observed at stop 9, the Central Station. The colors mean:

Blue: total leaves during the day / Orange: leaves during first peak / Grey: leaves during second peak.

We note that practically everyone in the tram is supposed to be at the CS stop. The only significant exception is during the morning peak, when few people also leave at Padualaan (103 out of a total occupation of 536 during the morning peak). Given the geographical location of the tram line, these are probably people parking their car at P&R Uithof and having appointments on the West side of the Uithof Campus. This seems to be an accurate representation of reality and therefore the values are kept as-is.

For CS -> Uithof:

Here we note that almost the entire tram is empty when the final stop is reached (only 15 people leaving at P&R Uithof over a whole day)

Colors are: Blue: whole day / Orange: first peak / Grey: second peak

This is caused by the tram line connecting the Central Train Station of Utrecht to a very busy part of Utrecht, at which many people from outside the city might have business: these people are likely to first take a train and then the tram.

We see only minor fluctuations of the leave/occupancy rate during the peak hours. We notice that the largest amount of passengers leave at the different stations at the Uithof: most visited being the padualaan stop. Given the high density of different University buildings used by different types of students at the same time, this seems to be an accurate representation of reality. Therefore the values are kept as-is.

We decided to simulate the leaving passengers as a fixed fraction of the amount of passengers per stop. This fraction is dependant of the stop and the time interval (off-hours, first peak, second peak) *Because the amount of passengers in the tram at that time is the result of several probability distributions, the amount of passengers leaving the tram is indirectly also a result of RNG. We estimate that this will therefore not lead to one-sided results in the simulation and is an accurate representation of the system.*