Analog design document P&D Ruben

# Variable gain amplifier

For the variable gain amplifier, an OTA and a digitally controlled system for automatic gain control (AGC). We want the OTA to be as close as possible to an ideal OTA, while considering the required bandwidth, the input CM range and so on. To ensure that the signal is within the input range of the ADC and makes us of the full dynamic range of the ADC, AGC is used. AGC can be implemented via digitally controlled switches that adjust the value of the (parallel) resistors that define the gain of the circuit.

## Proposed specifications and topology for the OTA

Gain: 40 dB or higher   
Bandwidth: at least 20.5 kHz (Carrier frequency)  
GBW: at least 2.05 MHz   
Input signal: 1 – 100mV

## Automatic gain control

# Analog-to-digital converter