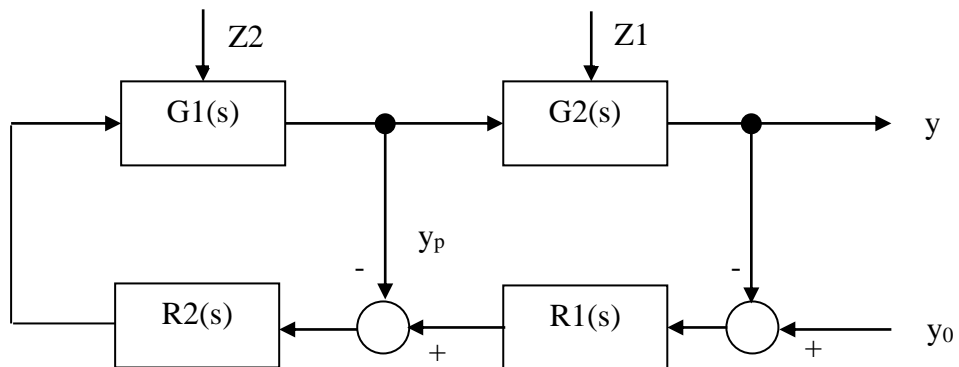


# CASCADE CONTROL

## 1. Scope

Properties of the two controller cascade structure  
Tuning the controllers

## 2. Cascade control

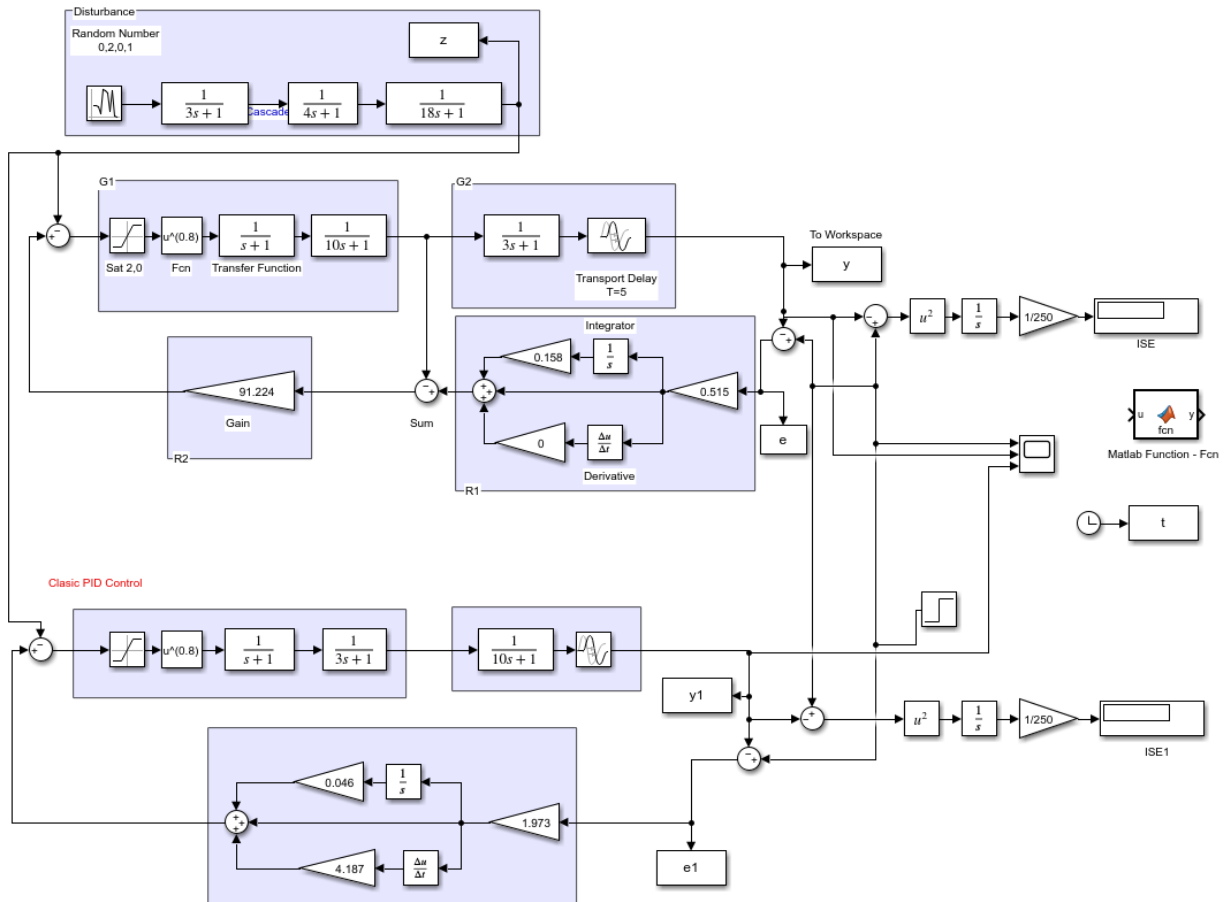


Rys. 1 Cascade Control Structure

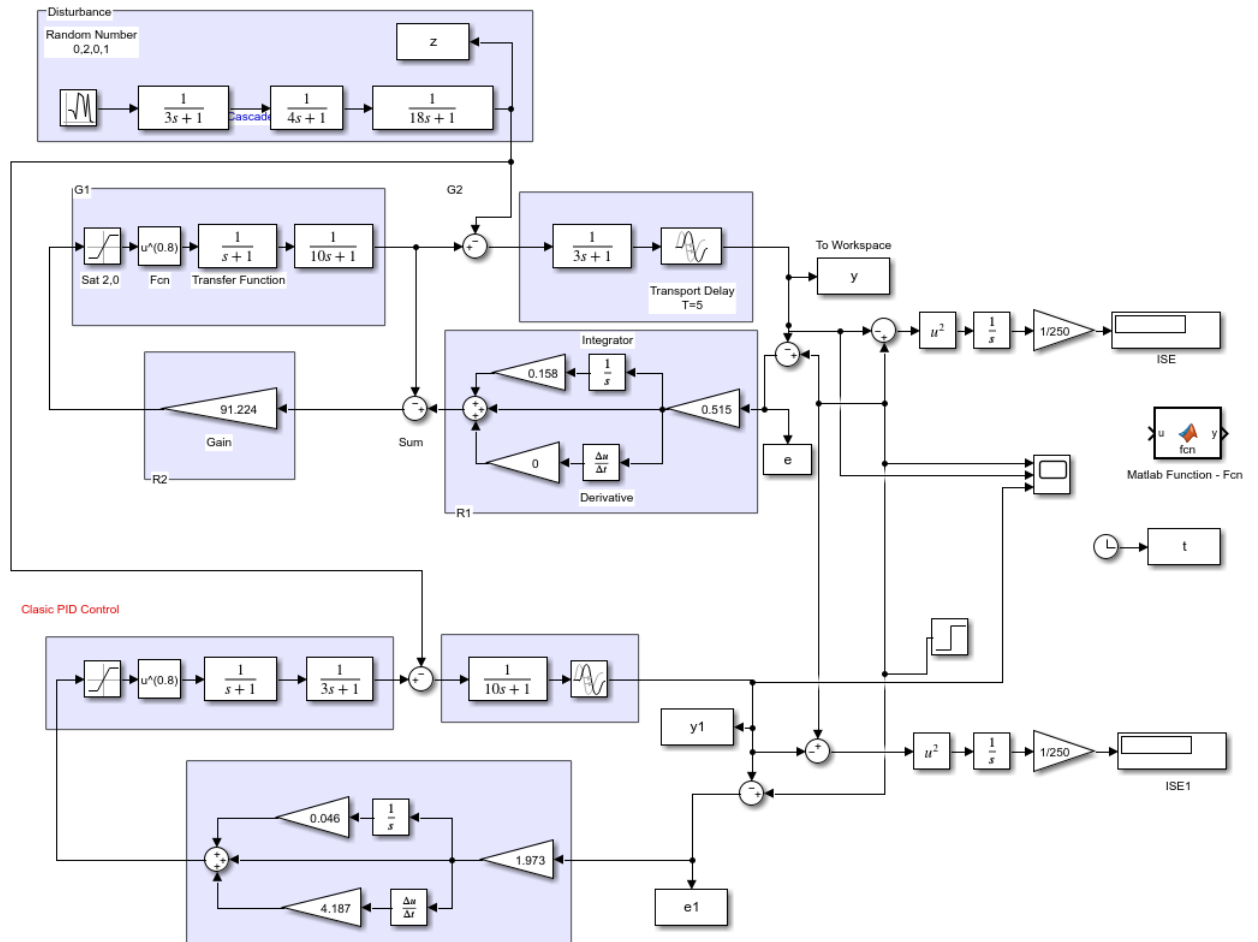
Create diagram in Simulink.

1. Tune the PID controller in single loop control system with one of known methods.
2. Tune the R2 controller (without R1 controller) for the G1 part of the object (without time delay). Observe  $y_p$  in response for the input.
3. Tune the R1 controller for  $G1+G2+R2$  (with R2 controller tuned in p.2)
4. Perform simulation with disturbance on G1 and G2. Plot  $y_1(t)$  for PID and  $y(t)$  for Cascade Control.

# Disturbance in inner loop



# Disturbance in outer loop

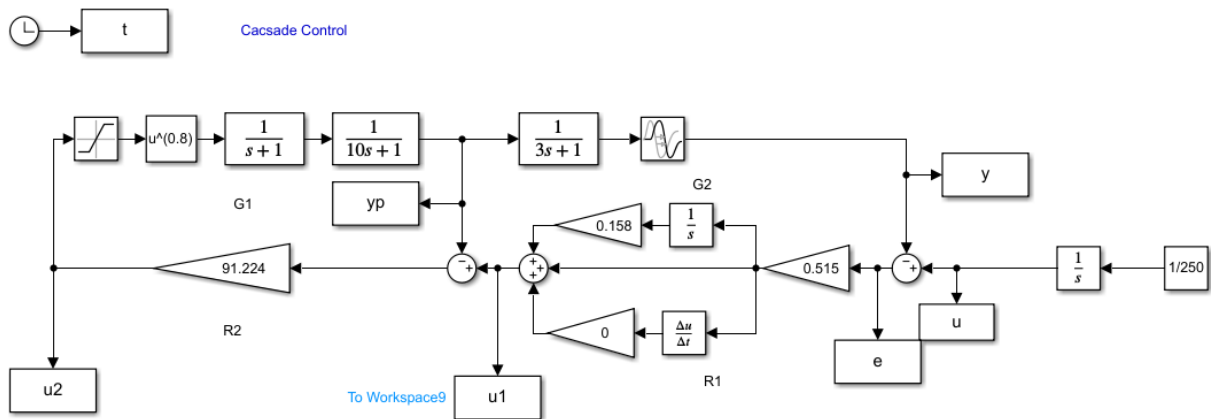


## Linearization of the static characteristic $G1(s)$

In following diagram plot :

$y_p=f(u1)$  – characteristic before linearization

$y_p=f(u2)$  – characteristic after linearization



### 3. Requirements

Properties of the Cascade Control.  
Methods of tuning controllers  $R1$  and  $R2$   
Quality of the control indexes.

### 4. References

- W. Findeisen : *Technika regulacji automatycznej*. PWN, Warszawa 1978
- M. Żelazny : *Podstawy automatyki*. PWN, Warszawa 1976
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- Z. Trybalski : *Laboratorium układów regulacji*. Gliwice 1980
- H. Górecki : *Analiza i synteza układów regulacji z opóźnieniem*. WNT, Warszawa 1971
- S. Skoczowski : *Technika regulacji temperatury*. Warszawa