



**NTNU – Trondheim**  
Norwegian University of  
Science and Technology



**HighEFF**

# **Split range control**

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Annual consortium meeting  
09 May 2019

## Motivation:

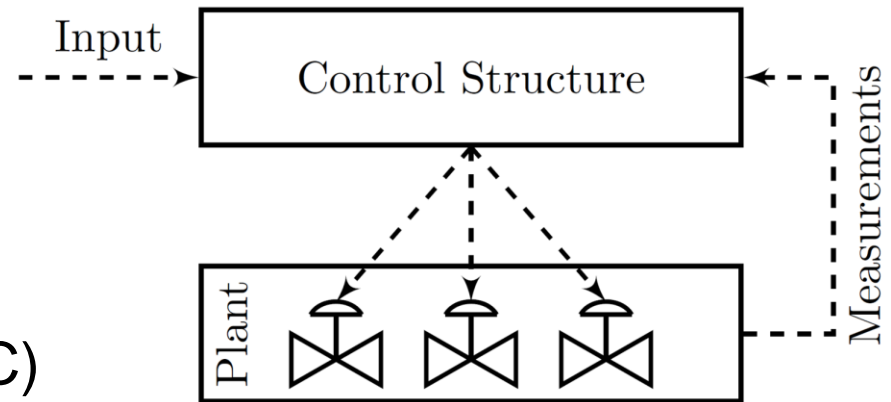
We often see that that control structures in industry are based on ad-hoc solutions, and most of them are application oriented.

What is missing is a theoretical background for these control strategies.

# Goal:

Systematic design procedure for **simple control structures** to implement **optimal operation**.

- cascade control
- feedforward control
- decoupling
- **split range control (SRC)**
- valve positioning control (VPC)
- selectors (min, max)



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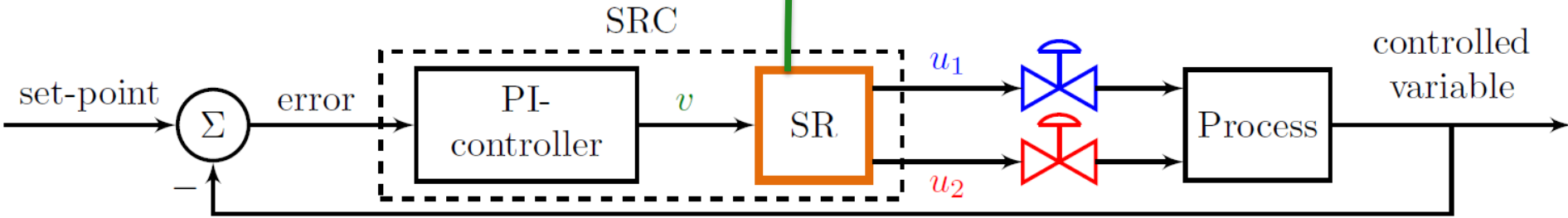
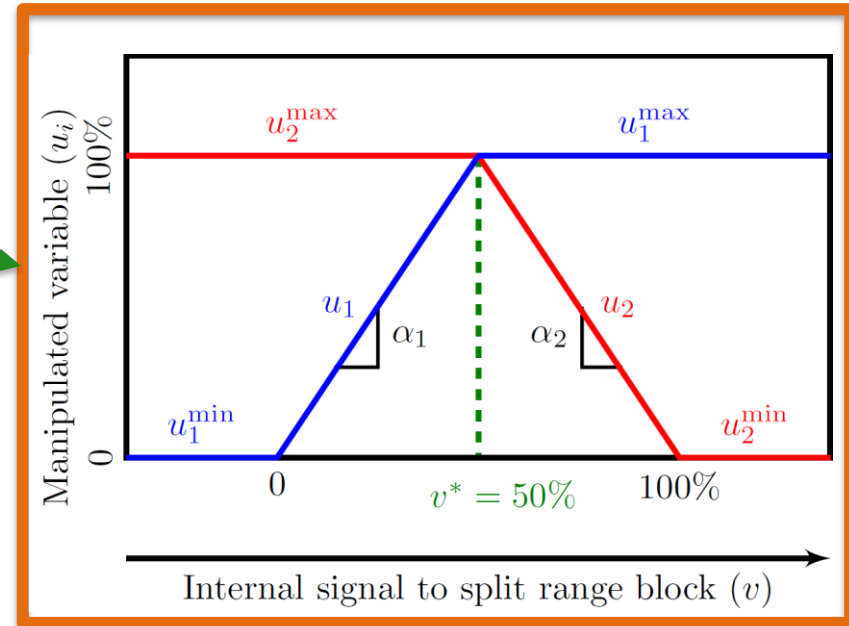


Extensively studied in academia

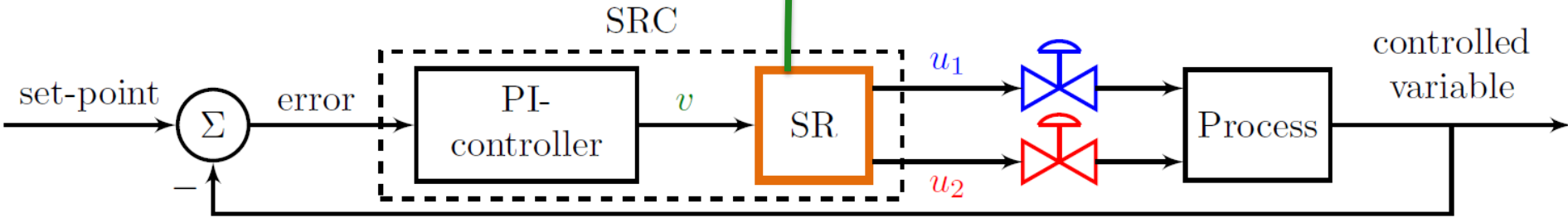
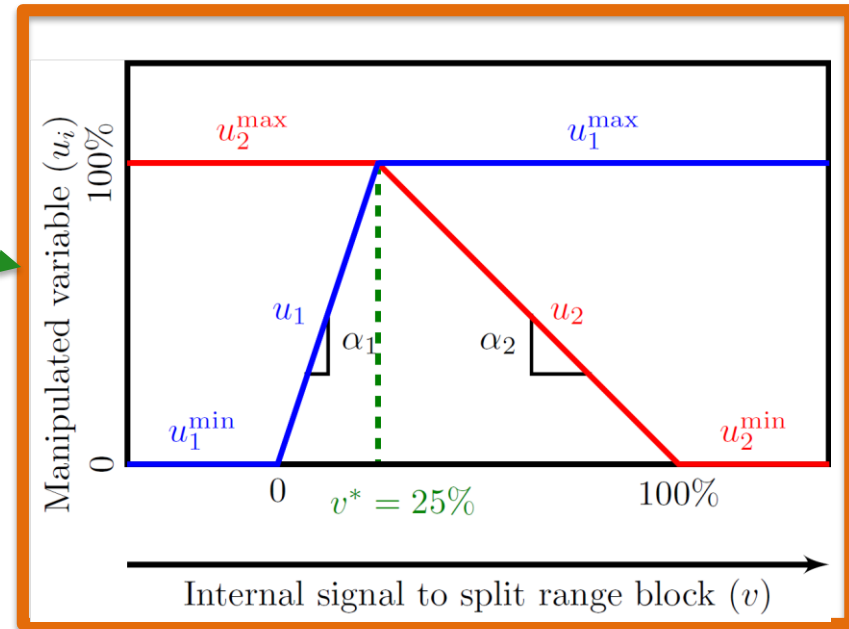
Highly used in industry

Little studied in academia

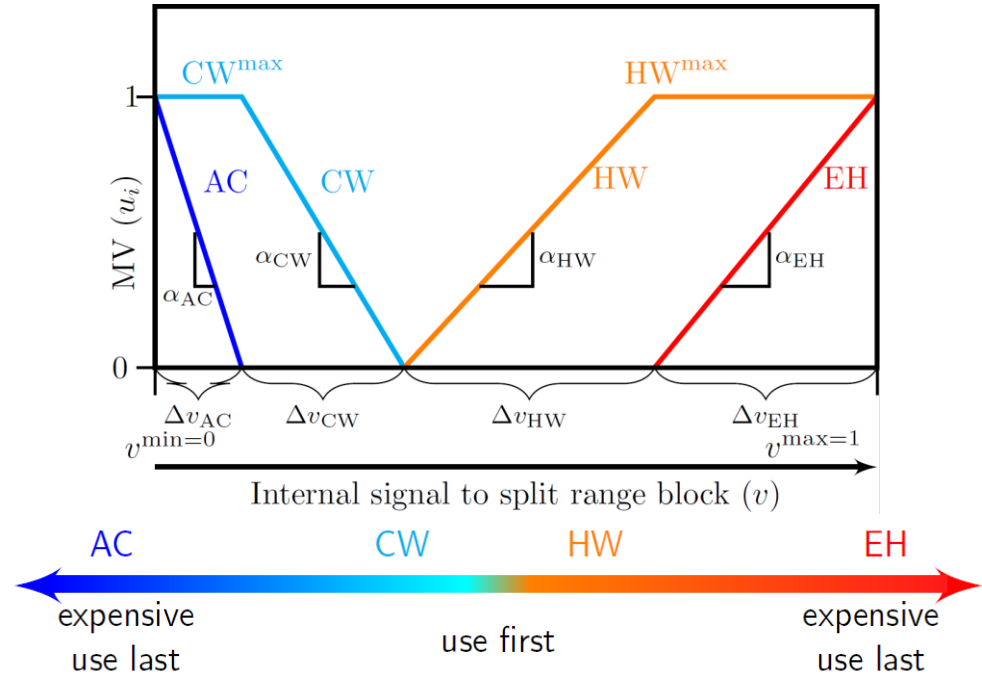
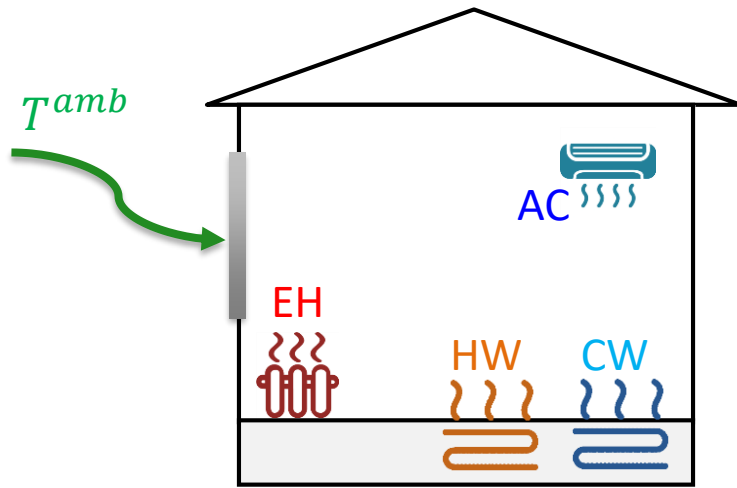
# Split-range control



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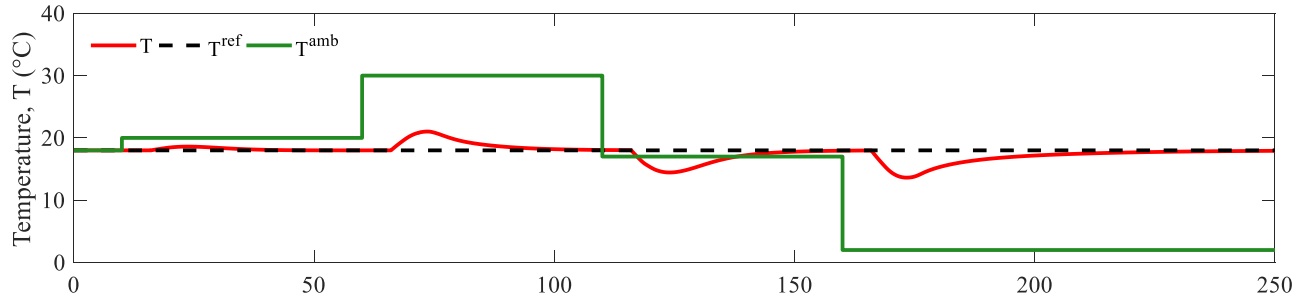


# Example: Room temperature control

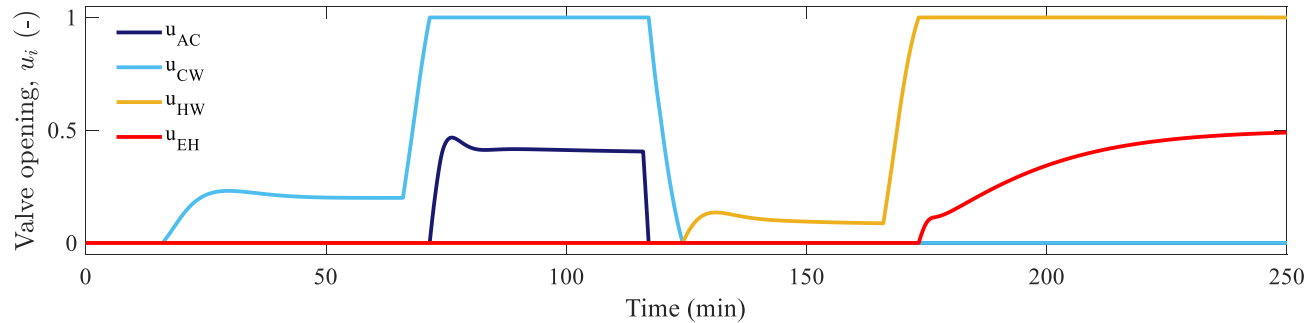


# Room temperature control.

## Changes in $T^{amb}$



**Controlled variable**



**Manipulated variables**



# References:

- Reyes-Lúa, A., Zotică, C., & Skogestad, S. (2018). Optimal Operation with Changing Active Constraint Regions using Classical Advanced Control. In *10th IFAC International Symposium on Advanced Control of Chemical Processes (ADCHEM)* (pp. 434–439). Shenyang, Liaoning, China: IFAC Papers Online.
- Reyes-Lúa, A., Zotică, C., Forsman, K. & Skogestad, S. (2019). Systematic Design of Split Range Controllers. In *12th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems (DYCOPS)*. Florianópolis: IFAC Papers Online.



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