Leibniz Forschungszentrum Energie 2050

Leibniz Universität Hannover

Hybrid Energy Storage Systems (HESS)

Theoretical Dimensioning and Sizing Limits

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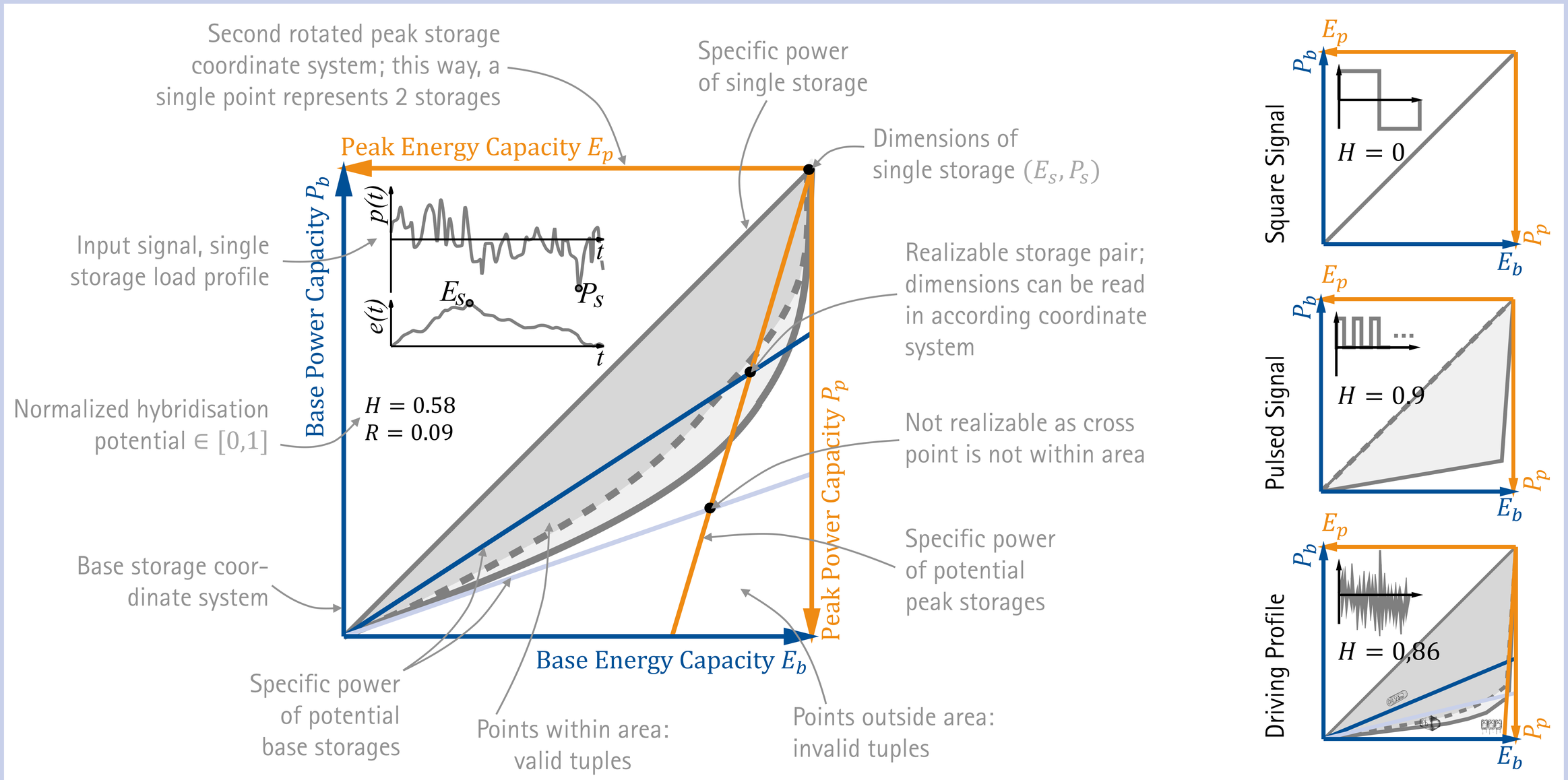
About HESS

- Usage of different storage technologies to combine advantages
- Decrease costs, size, weight; increase efficiency, self discharge rate, response rate, lifetime
- Common approach: combine a high energy storage with slow response rate (e.g. a battery) and a high power storage with fast response rate (e.g. a super capacitor)

This Study

- Analytical calculation for predimensioning
- Separates dimensioning process from control strategy, making design process transparent
- Focus on tuning power to energy ratio (specific power) to meet requirements of storage load profile to decrease size and acquisition costs
- Potential analysis; introduction of hybridisation diagram; characterisation of load profile



Further Reading

- *github.com/s-guenther/hybrid* - Ready to use toolbox with documentation and examples
- Günther, S., Bensmann, A., Hanke-Rauschenbach, R. (2018): *Theoretical dimensioning and sizing limits of hybrid energy storage systems.* Applied Energy 210, 127.

Outline of Approach

Tablet Missing?

See
github.com/s-guenther/hybrid/
docs/informal_introduction.md

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