

How to maximize power extraction of a wind turbine?

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Progress:

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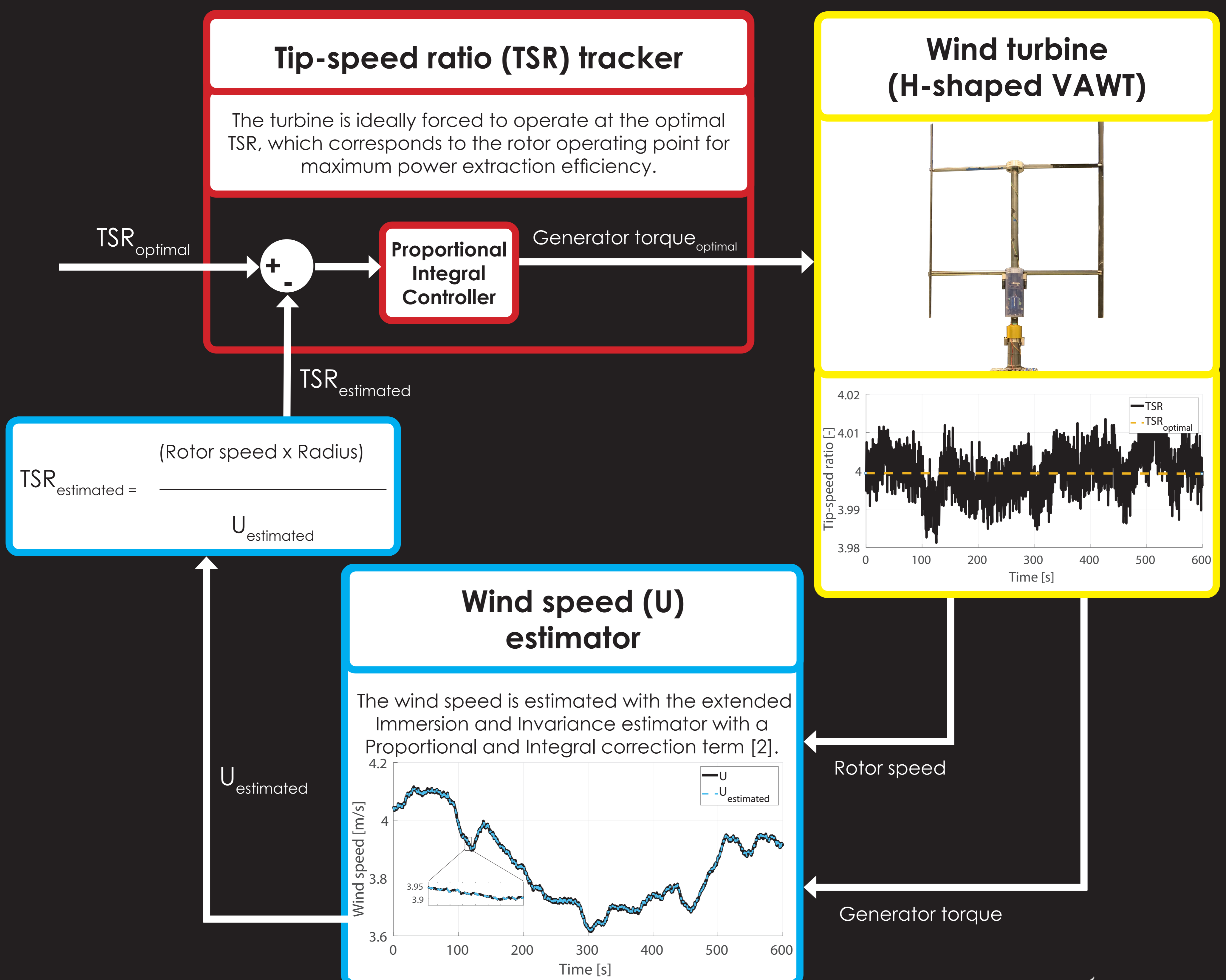
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- Modern wind turbines usually employ a variable-speed variable-pitch (VS-VP) operating strategy, and thereby use a generator torque control to **maximize energy capture in below-rated** operating conditions.
- The most common partial load wind turbine torque control strategy is the ***K-omega-squared*** controller, being a fixed mapping as a function of the generator speed. This control scheme has a **predefined control responsiveness** and **relies heavily on modeled aerodynamic rotor characteristics**.
- A combined wind speed estimator and tip-speed ratio (**WSE-TSR**) tracking control scheme is proposed as a partial solution. The WSE-TSR scheme provides flexibility in terms of controller responsiveness and potentially **improves power extraction performance** [1].

But are we really sure that the WSE-TSR does not rely on information about the wind turbine [3]?

CHECK THIS OUT!



[1] Bossanyi EA 2000 The Design of closed loop controllers for wind turbines *Wind Energy* 3 146-163

[2] Liu Y, Pamososuryo A, Ferrari R, van Wingerden JW 2022 The Immersion and Invariance wind speed estimator revisited and new results, *IEEE Control Systems Letters* 6 361-366 (2104.07696)

[3] Brandetti L, Liu Y, Mulders SP, Ferreira C, Watson S, van Wingerden, JW 2022 On the ill-conditioning of the combined wind speed estimator and tip-speed ratio tracking control scheme, *Journal of Physics: Conference Series*