On the Uncertainty of Wind Power Generation
continuous report

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Reader's Guide

List of changes in this iteration:

- Removed the term $p(1-p)$ from the model.
  - derived the new ODE for the moments.
  - simulated and built the confidence intervals.
- Non-academic poster prepared.

Next steps:

- The french data set
  - Organize and clean.
  - Normalize by the changing installed capacity.
  - Obtain the optimal parameters.
  - generate paths and build the confidence bands.
  - consider seasonality and human intervention.
- Check the performance of the optimization.
- simultaneous versus point-wise confidence bands.

Note :

- Green slides: possible future extensions
- Red slides: notes to be removed

Moments of the process

After removing the term $p_t(1-p_t)$ from the model, the first moment is unaffected and the second moment of the process is now given by,

$$\frac{dm_2(t)}{dt} = 2 - m_2(t)\theta(1+\alpha) + \alpha\theta m_1(t)((1-2p_t) + p_t(1-p_t)))$$

Moments of the process after Lamperti transform

After removing the term $p_t(1-p_t)$ from the model, the moments of the process are now given by,

$$m_1(t_2) = \arcsin\left(e^{-\int_{t_1}^{t_2}\theta_t(1-2\alpha)\ dt}\left(\int_{t_1}^{t_2}\theta_s(2p_s-1)e^{\int_{t_1}^{s}\theta_t(1-2\alpha)\ dt}\ ds + \sin(z_{t_1})\right)\right)$$

$$m_2(t_2) = 2\alpha\int_{t_1}^{t_2}\theta_t\ dt + m_2(t_1)$$

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