Notes from pdf:

[] – means reference from paper

[1] A logistic function or logistic curve is a common S-shaped curve (sigmoid curve) with equation - Wikipedia, "Logistic function", <https://en.wikipedia.org/wiki/Logistic_function>

[2] The logistic function is exponential for early times, but the growth slows as it reaches some limit. - xaktly.com, "Logistic functions", <https://xaktly.com/LogisticFunctions.html>

[3] Image of wind turbine and hub height - David Darling, "wind turbine hub height", <https://www.daviddarling.info/encyclopedia/H/AE_hub_height.html>

[4] This - International Electrotechnical Commission, "IEC 61400-1, Wind turbine generator systems. Part 1: safety requirements, 2005", <https://webstore.iec.ch/preview/info_iec61400-1%7Bed3.0%7Den.pdf>

[5] Vestas Wind Systems [Online]. Available from http://www.vestas.com (accessed 05.03.14).

[6] Enercon[Online].Available fromhttp://www.enercon.de(accessed05.03.14).

[7] Siemens Wind Power [Online]. Available from http://www.energy.siemens. com (accessed 05.03.14).

[8] Repower [Online]. Available from http://www.senvion.com (accessed 05.03.14).

[9] Nordex [Online]. Available from http.nordex-online.com (accessed 05.03.14).

[10] To explain piecewise continuous - Piecewise, "Wikipedia", <https://en.wikipedia.org/wiki/Piecewise>

[11] To explain piecewise continuous - George C., "What is a piecewise continuous function?", <https://socratic.org/questions/what-is-a-piecewise-continuous-function>

[12] Piecewise Continuous Functions - Open Calculus, "Piecewise Continuous Functions", <https://math.dartmouth.edu/opencalc2/cole/lecture18.pdf>

[13] Wind Turbine Power Curves [Online]. Available from <http://www.academia.edu/1489838/Wind> Turbine Power Curves (accessed 05.03.14).

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WT = wind turbine

Abstract:

They are basically saying that the "current procedure" (whatever that is) used to get the parameters (measurements that describe) of the logistic function [1, 2], that this produces parameters when applied to the power curve of wind turbines.

They say that these values are different for each turbine and we need a optimization process. This paper will propose a better way to gain the 4-parameters (apparently there are 4) of the wind turbine logistic function by using the features of the curve itself (pretty sure they mean ML here). Then they go on to talk about the different models? Might have to come back to that.

1. Introduction:

The WT power curve shows the relationship of the wind speed (at hub height [3]) and the electric output of the turbine, this curve is widely used. This paper uses the manufacturers power curve in the documentation, but they claim that the curve will be different in wind farms due to different operating conditions. Different weather conditions and component fatigue will affect operating conditions. Basically the older it gets the less likely it is to be able to function the same. The power curve given by the manufacturer is a good approximation to use nonetheless.

“As defined in [4], WT manufacturers obtain the power curve from tests that provide pairs of points for wind speed-power every 0.5 m/s” The data given is irregular so this is not the same data we were given. They are using the function P=f(u) to describe the power curve so it is some function of wind speed (u - I assume will have to double check) which produces the electrical output (P – P is usual used for Power but will have to check) and that this minimizes the distance to these points (don’t understand this last part). “Manufacturers [5-9] usually provide a graph establishing this relationship, which can be very helpful when obtaining the output power of a WT from the wind speed at hub height.” When computing using a graph can be cumbersome and this is why mathematical expressions (or functions) are used to represent the power curve. “The expressions can substitute the pairs of points for piecewise continuous [10-12] or continuous functions.” I think this either means that it can substitute as in predict or substitute as in fill in whats missing in the function (kind of guess what goes in between two point.

The models can be used to “indicate anomalies in the WT working, to forecast the power supplied by a WT, to simulate potential scenarios of wind power production and to compare the performance of different WT”. There are many different models that will do the job. “In most cases, models consist of a continuous or piecewise function defined for all values of wind speed, extending the values obtained in the manufacturer’s tests [13] to all possible values” **“Furthermore, given that the output power of a WT equals zero for values of wind speed lower than the cut-in wind speed, uci, (2–5 m/s) and higher than the cut-out one, uco, (20–30 m/s), this will be the interval to define a model for the power curve.”**