

Catching the wind



VERTICAL AXIS WIND TURBINES



Darrieus



Helical



H Rotor



Savonius

Green

Green

Location

Green

Location

Theoretical limit

59.3%

Mass, Momentum and Energy

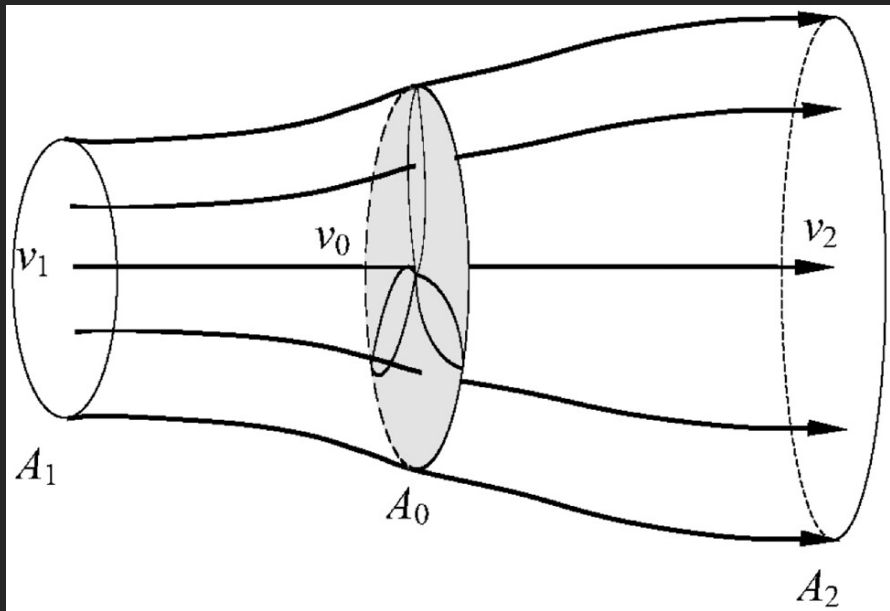
Mass, Momentum and Energy

Wind must keep moving after the turbine

Mass, Momentum and Energy

Wind must keep moving after the turbine

Ideal



Step-by-step derivation

Step-by-step derivation

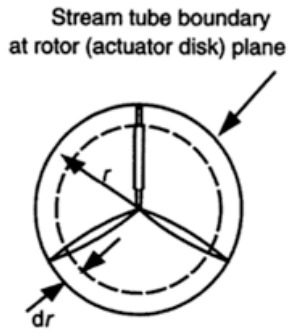
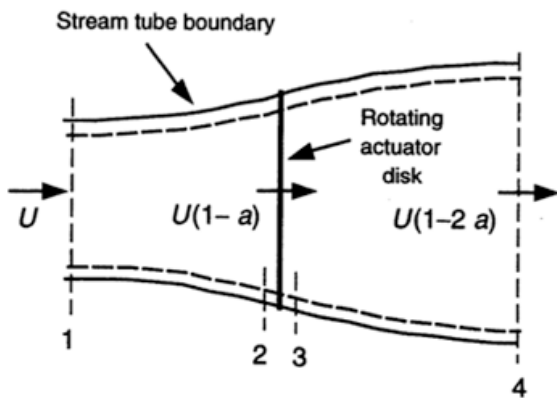
Basic physics

Step-by-step derivation

Basic physics

Calculus and Algebra

Actuator Disk Model



[Manwell, 2009]

Replace Turbine

Replace Turbine

General

Replace Turbine

General

Axial Induction Factor

What about VAWTS?

Drag vs Lift limit?

Drag vs Lift limit?

Revisit Assumptions

Drag vs Lift limit?

Revisit Assumptions

Explore, Test, Critique