Assignment:

For the following helicopter data,
Weight, W = 45,000N
Radius, R = 6.6 m
Chord, c = 0.5 m
Number of blades, N_b = 4

Rotational speed, Ω = 250 RPM,

Lift curve slope, $a = 2\pi$

Drag coefficient, C_{d0} = 0.01 and 0.001 (two cases)
Empirical correction factor (to correct for non-uniform inflow, tip loss, and slipstream swirl, by applying the following formula)

$$\lambda = \kappa_h \sqrt{\frac{C_T}{2}}$$

κ_h= 1.15

ρ = 1.224 Kg/m^3

Pretwist, θ_{tw}=0.0

Solve

(i) Inflow, pitch angle in degrees, induced power, profile power, and figure of merit under a small angle assumption.

(ii) Inflow, pitch angle in degree, induced power, profile power, and figure of merit without the small angle assumption. Develop and implement all the required equations using a computational software like Mathematica or MATLAB.

(iii) Compare the results between (i) and (ii), and submit your own discussion.

Due date: 04/17/2020 6:00 PM (to be submitted by an electrical form)