		05_HSVA_PPB	05_HSVA_QCM	06_INSEAN	10_UniTriest
A - Theoretical model					
A1	**Formulation**				
	Vortex Lattice Method		x		
	Boundary Element Method	x		x	x
A2	**Primary unknowns**				
	scalar potential - Neumann problem			x	
	scalar potential - Dirichlet problem	x			x
	velocity components				
	bound vorticity - Neumann problem		x		
	bound vorticity - Dirichlet problem				
B - Numerical scheme and discretisation					
B1	**Solution domain**				
	time domain		x	x	x
	frequency domain	x			
B2	**Discretisation of field variables**				
	low order: quantities piecewise constans on elements	x	x	x	x
	high order				
B3	**Discretisation of boundary surfaces**				
	triangular panels	x			
	flat quadrilateral panels	x			
	non-flat panels			x[5]	x[10]
	discrete vortex elements		x		
B4	**Evaluation of source and doublets influence coefficients**				
	analytical expressions	x	--	x[6]	x[11]
B5	**Evaluation of pressure**				
	linear Bernoulli's equation	x	x		x
	non-linear Bernoulli's equation			x	
B6	**Evaluation of potential gradient terms in the Bernoulli's equation**				
	direct (velocity based formulations)		x		
	by finite differences of velocity potential	x		x	x
	as gradient of integral equation for the velocity potential				
B7	**Pressure condition at blade trailing edge**				
	linear Kutta condition	x		x	
	non-linear Kutta condition				x
	implicit Kutta condition (due to arrangement of singul. / contr. Points)		x		
B8	**Pressure correction at blade leading edge**				
	not included	--		x	x
	included	--	x[2]		

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C - Propeller geometry description					
C1	**Number of blades: steady flow**				
	one blade solved, solution dublicated on all blades	x	x	x	x
	all blades solved				
C2	**Number of blades: unsteady flow**				
	one blade solved, solution shifted and transferred to other blades	x	x		x
	all blades solved			x	
C3	**Propeller hub**				
	isolated blades without hub	x	x		
	hubbed propeller: blades attached to solid hub	x		x	x
C4	**Blade shape adaptions**				
	blade tip cutting			x[7]	x[12]
	blade trailing edge sharpening enforced to avoid blunt shape	x	x	x	x
D - Trailing wake model					
D1	**Type of wake geometry model**				
	prescribed wake - fixed pitch				x[13]
	prescribed wake - variable pitch	x[1]	x[3]		
	prescribed wake - radial contraction				
	KT				
	wake alignment iterative procedure - full alignment: all wake node coordinates (x,r,θ) updated			x	x[14]
	wake alignment iterative procedure - partial alignment				
D2	**Evaluation of velocity field**				
	direct (velocity based formulations)	--	--		
	by finite differences of velocity potential	--	--		
	as gradient of integral equation for the velocity potential	--	--	x	x
D3	**Treatment of singularities associated to wake-induced velocities**				
	velocity evaluated at points displaced from actual wake surface	--	--		
	finite-size vortex core model	--	--	x	x
	desingularization model	--	--		
D4	**Tip vortex**				
	tip-vortex detachment point rigidly associated to blade surface discretization	--	--	x	x
	evaluation of tip vortex detachment point and wake surface adaptation	--	--		
D5	**Leading edge vortex**				
	modelling not included	x	x	x	x
	modelling included				

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E - Viscous flow model					
E1	**Semi-empirical corrections**				
	not included, blade loads from full potential flow solution				
	friction-induced correction to blade	x[4]	x[4]	x[8]	x[15]
	high blade angle-of attack correction to blade loads			x[9]	x[16]
E2	**Viscous / invicid coupling models**				
	not included	x	x	x	
	potential flow model coupled with boundary layer solver, via: two-dimensional boundary layer model				x[17]
	potential flow model coupled with boundary layer solver, via: three-dimensional boundary layer model				
F - Cavitation model					
F1	**Two-phase flow modelling**				
	conformal mapping				
	linearised cavity theory	x	x		x
	non-linear surface tracking methods			x	
F2	**Coupling with unsteady flow ananlysis**				
	steady cavitation model (quasi-steady approach)	x	x		
	unsteady cavitation model (fully-unsteady approach)			x	x
F3	**Numerical scheme**				
	2D model solved stripwise on 3D blade surface		x		
	full 3D model	x		x	
	singularities on actual cavity surface (fully non linear model)				
	singularities kept fixed on body surface (partially non linear model)	x	x	x	x
F4	**Cavitation types addressed**				
	sheet cavitation on solid surfaces - blade suction side	x	x	x	x
	sheet cavitation on solid surfaces - blade pressure side				x
	supercavitation	x	x	x	x
	vortex cavitation				
	bubble cavitation				
F5	**Sheet cavity detachment model**				
	detachment point imposed	x	x	x	x
	determined from local pressure distribution				x
	determined from boundary layer flow characteristics				
	determined from body surface curvature (i.e., smooth detachment condition)				x
F6	**Sheet cavity closure model**				
	open cavity (50% closed)	x	x		
	closed cavity			x	x
	re-entrant jet model				

1) leaving at pitch of blade / reaching constant asymptotic wake pitch
2) Nose Radius entered
3) leaving at pitch of blade / asymptotic wake with beta_i
4) section drag formula depending on local Re-number=quasi stripe method
5) bilinear interpolation among panel edges
6) Morino, Chen, Suciu, 1975.
7) R: > 99.5%
8) flat plate analogy, laminar and turbulent flow, transition condition imposed
9) see report
10) hyperboloidal panels
11) Morino, L. e Kuo, C.C. Subsonic Potential Aerodynamic for complex configuration: a general theory. AIAA Journal, 12(2) pp. 191-197, 1974.
12) We use a finite value of chord at tip to avoid excessive skewed panels
13) mean between geometrical and hydrodynamic pitch, adopted in present work for cavitating analysis
14) adopted for open water computations in present work
15) Frictional Line with Van Oossanen formulation for thickness/chord or constant drag coefficient
16) Polhamus suction analogy
17) not adopted in present calculation but possible within the developed solver