

OctarviaWeb

OCTARVIA *Index*

PROGRAM MODE

- OCTARVIA - Index
- OCTARVIA - Prediction
- Simulation for fouling and aging effect

CALCULATION ITEMS

- (1) Evaluation of external forces
 - (1-1) Added resistance in short crested irregular waves
 - (1A) Added resistance in regular waves
 - (1B) Linear superposition for added resistance in short crested irregular
 - (1-2) Wind force and moment coefficients
 - (1-3) Hydrodynamic coefficients
- (2) Evaluation of ship performance in actual seas and its changes
- (3) Lifecycle fuel consumption

Data Input Calculation Save Load Clear

Import from SALVIA-OCT.

Import from EAGLE-OCT.

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OCTARVIA-web スタートアップガイド



(国研) 海上・港湾・航空技術研究所
海上技術安全研究所

※ 画面のデザインは変更することがあります。

ご利用の前に

ご利用に当たっては、海技研クラウドにアクセスいただき、

- ✓ 会員登録
- ✓ アプリ利用申請

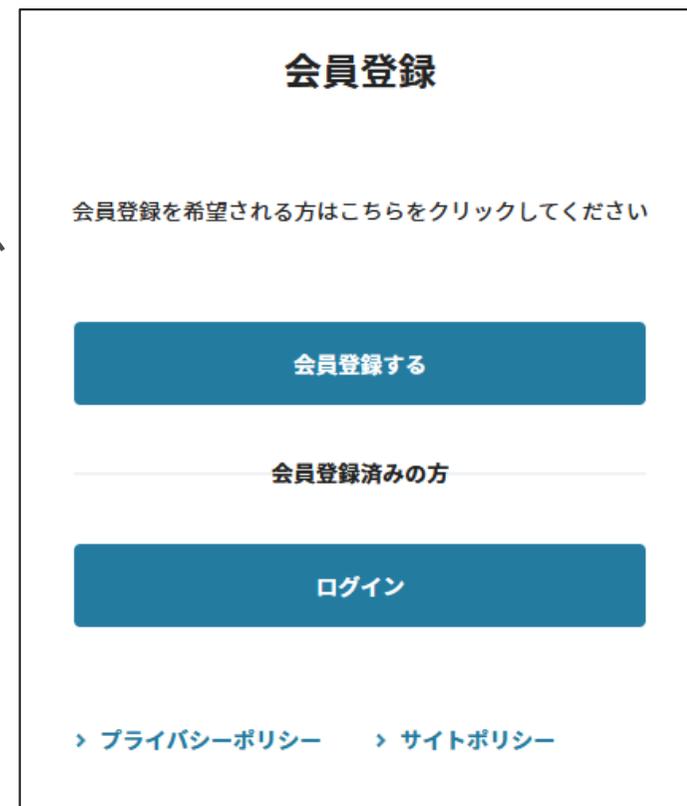
を実施いただく必要があります。

海技研クラウド 会員登録：

<https://cloud.nmri.go.jp/portal/auth/signup>

利用申請後、2週間後からご利用いただけます。

推奨環境：Google Chrome, Microsoft Edge



海技研クラウド 会員登録画面
(登録が終わるとアプリ利用申請画面に移ります)

OCTARVIA-webの概要

- 船舶のライフサイクルにおける実海域性能を、燃費として評価するプログラムです
- webブラウザ上で動作します
- 船型データを入力として、波・風・斜航・当舵の外力を計算します
- 外力計算をベースに主機作動特性を考慮して実海域中の船速・燃料消費量を計算します
- 航路ごとの海象の寄与、往路・航路の積載状態の違い、経年劣化・クリーニングによる影響を考慮し、評価期間（ライフサイクル）における生涯燃料消費量を算出します
- 評価海象ごとのパワーカーブ、短期予測結果を波向・風向ごとに出力します

プログラムの起動

- **webブラウザ**（Google chrome, Edge, Firefox）を起動します
- **海技研クラウド**（<https://cloud.nmri.go.jp/portal/pub/top>）にアクセスします
- Top 画面右上のボタンから**ログイン**します
- Top画面に戻り、右上の**アカウント名（メールアドレス）**をクリックします
- ご利用可能なクラウドサービス一覧から**OCTARVIA-web(Full version/Limited Version(Free))**を選び、クリックします

プログラムTOP画面

■3つの計算モード

■OCTARVIA - Index:

- ライフサイクル主機燃費を評価する場合

■OCTARVIA - Prediction:

- 任意海象下で実運航性能シミュレーションを行う場合

■Simulation for fouling and aging effect:

- 生物汚損、経年劣化による出力増加率の評価を行う場合

Predictionモード

プログラムの構成(Predictionモード)

OCTARVIA Prediction

PROGRAM MODE

- OCTARVIA - Index
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- Simulation for fouling and aging effect

CALCULATION ITEMS

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 - (1-2) Wind force and moment coefficients
 - (1-3) Hydrodynamic coefficients
- (2) Performance simulator for ships in actual seas

Data Input Calculation Save Load Reset

Import from SALVIA-OCT. Export for SALVIA-OCT.

Import from EAGLE-OCT.

■ Predictionモードの計算項目

- ✓ 外力計算
- ✓ 実運航性能シミュレーション

■ 計算の流れ

- ✓ 計算項目の選択
- ✓ 入力データの作成
- ✓ Calculation
- ✓ 出力の確認

データ入力

- メインインプットシート
- サブインプットシート
- ボタンリンク

InputData

Ship

Selector for the calculation mode

Item	Value	Unit	Remarks
<i>idlm</i>	1	-	selector for the calculation of surge, lateral ship motion
<i>IDST</i>	2	-	ID of ship type for calculation of steady sway force and Cargo, 5: fishing boat]
<i>IDSPPFr</i>	1	-	selector for calculation relating with self propulsion factor
<i>IDSPPF</i>	1	-	selector for the self propulsion factors: <i>IDSPPF</i> (1: linear expression with ship speed, 2: based on load variation linear expression with ship + based on load variation te

ship geometry

Item	Value	Unit	Remarks
<i>Builder</i>	NMRI	-	builder (within 50 characters)
<i>Type</i>	CONT	-	type of ship (within 50 charac
<i>ID</i>	762	-	ship ID number
<i>L_{ps}</i>	300	m	length between fore position
<i>L_{OA}</i>	318	m	length overall($L_{OA} \geq L_{ps}$): <i>L_{OA}</i>
<i>B_{max}</i>	40	m	maximum breadth; <i>B_{max}</i>
<i>d_{mid}</i>	14	m	draft at midship; <i>d_{mid}</i>
<i>d_{aft}</i>	14	m	draft at aft; <i>d_{aft}</i>
<i>d_{fore}</i>	14	m	draft at fore; <i>d_{fore}</i>
<i>L_A</i>	0	m	overhanging length at aft; <i>L_A</i>
<i>k_{yy}/L_{ps}</i>	0.25	m	nondimensional longitudinal
<i>k_{zz}/L_{ps}</i>	0.25	m	nondimensional transverse ra
<i>X_G</i>	-1.7715	m	longitudinal position of the ce
<i>O_G</i>	2.45	m	height of center of gravity abo
<i>G_{xx}</i>	1.22	m	transverse metacentric height

speed

Item	Value	Unit	Remarks
<i>nfn</i>	4	-	number of Froude number ($4 \leq nfn \leq 10$)

F_n $F_n \geq 0.03$; *F_n* should be input ascending order

a damping coefficient to roll motion for linear term; *a*

b damping coefficient to roll motion for quadratic term; *b*

<i>F_n</i>	<i>a</i>	<i>b</i>
[-]	[-]	[1/deg.]
0.150	0.37	0.028
0.188	0.5	0.023
0.235	0.25	0.076
0.265	0.23	0.078

Performance

resistance in still water

[resistance in still water](#)

engine

[Engine](#)

propeller

[propeller](#)

self propulsion factors

[self propulsion factors](#)

ship speed

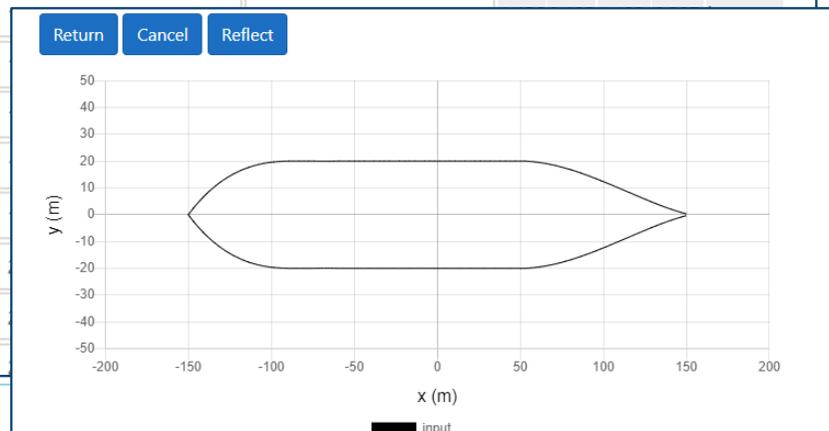
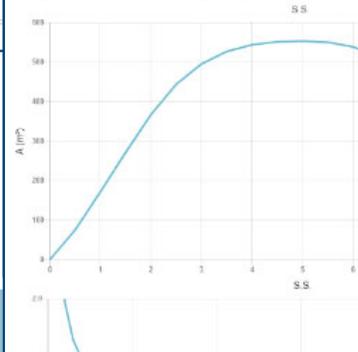
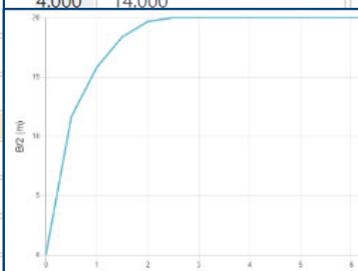
Item	Value	Unit	Remarks
<i>V_S</i>	25	-	knot designated ship speed; <i>V_S</i>

directional wave spectrum

入力：船型データ

Item	Value	Unit	Remarks
Builder	NMRI	-	builder (within 50 characters)
Type	CONT	-	type of ship (within 50 characters)
ID	762	-	ship ID number
L_{ps}	300		
L_{OA}	318		
B_{max}	40		
d_{mid}	14		
d_{aft}	14		
d_{fore}	14		
L_A	0		
k_{yy}/L_{ps}	0.25		
k_{zz}/L_{ps}	0.25		
X_G	-1.7715		
O_G	2.45		
G_M	1.22		
T_φ	26		
C_B	0.65		
C_{pa}	0.672		
C_{wa}	0.888		
C_{vp}	0.8106		
idrd	0		
A_T	1546.67		
A_L	9018.67		
A_{OD}	4859.56		
C_{dis}	-11.34		
H_{BR}	38.67		

S.S.	$d(i)$	$B(i)/2$	$A(i)$	$H_0(i)$	$\sigma(i)$	σ_{upper}	σ_{lower}	LF check
-	m	m	m ²	-	-	-	-	-
	0.000	0.010	0.0001	1.000	0.500	1.178	0.295	in



CHECK bluntness coefficient This button requires following input data; B , isp , $nd0$, $x(i)$ and $B(i)$.

$nd0$ 100 -
 $nd0$ - number of section for calculating Bluntness coefficient (A.P. to F.P.) ($nd0 \leq 1001$)
 $x(i)$ m position of the section (+ means fore from midship) ($i=1,2,\dots,nd0$)
 $B(i)$ m sectional breadth at L.W.L. ($i=1,2,\dots,nd0$)

$x(i)$	$B(i)$	$B(i)/2$	$-B(i)/2$
m	m	m	m
-150.000	0.010	0.005	-0.005
-146.970	4.807	2.404	-2.404
-143.939	9.214	4.607	-4.607
-140.909	13.244	6.622	-6.622
-137.879	16.915	8.457	-8.457
-134.848	20.242	10.121	-10.121

■ メインインプットシート

■ サブインプットシート

■ 図で形状を確認

✓ 要目データ

✓ 横断面形状パラメータ

✓ 水線面形状

✓ 水面上投影面積

入力：舵

rudder			
Item	Value	Unit	Remarks
x_R	-148.23	m	distance between center of gravity and rudder shaft (+ means fore from center of gravity); x_R
A_R	93.312	m ²	projecter lateral area of rudders; A_R
H_R	11.7	m	rudder height; H_R
Λ_R	1.467	-	aspect ratio; Λ_R
C_{RUD}	1	-	coefficient for starboard and port rudder; C_{RUD}
ID_{RUD}	1	-	selector for the rudder type; ID_{RUD} (1: conventional rudder, 2: Schilling rudder, 3: others)
C_{AR}	1	-	coefficient for the projected lateral area or rudders; C_{AR}

■ 舵主要目

- ✓ 舵軸の位置
- ✓ 可動部面積
- ✓ 舵高さ
- ✓ アスペクト比
- ✓ 高揚力舵セクター

入力：船舶性能データ

Performance

resistance in still water
resistance in still water

engine
Engine

propeller
propeller

self propulsion factors
self propulsion factors

■ Resistance in still waterボタン

- ✓ 平水中抵抗係数

■ Engineボタン

- ✓ 燃料消費率
- ✓ 主機最大回転数
- ✓ 過負荷防止パラメータ

■ Propellerボタン

- ✓ プロペラ要目データ
- ✓ 単独特性

■ self propulsion factorsボタン

- ✓ 平水中自航要素（荷重度変更データ）

入力：海象データ

weather

Item	Value	Unit	Remarks
nweather	30		number of designated weather condition ($1 \leq nweather \leq 50,000$)

U_{wind}	m/s	mean true wind speed; U_{wind}
γ	deg.	mean true wind direction (0 deg. means heading winds.) ($0 \leq \gamma$); γ
H_W	m	significant wave height of wind waves; H_W
T_W	s	mean wave period of wind waves; T_W
θ_W	deg.	primary wave direction of wind waves (0deg means heading waves.) ($0 \leq \theta_W$); θ_W
H_S	m	significant wave height of swells; H_S
T_S	s	mean wave period of swells; T_S
θ_S	deg.	primary wave direction of swells (0deg means heading waves.) ($0 \leq \theta_S$); θ_S
H	m	significant wave height of measured wave spectrum; H
ψ_N	deg.	heading direction (0 deg. means north direction.) ($0 \leq \psi_N < 360$); ψ_N
X_C	-	control parameter according to engine operating condition; X_C [isele=1: $X_C=N_{Ec}$, isele=2: $X_C=N_{Ec}$, isele=3: $X_C=BHP$, isele=4: $X_C=V_{Sc}$]
isele	-	selector of engine operating condition; isele [1: constant revolution, 2: limited by fuel index, 3: constant power, 4: constant ship speed]
N_{Ec}	rpm	engine revolution for calculation; N_{Ec}
BHP	kW	output of engine for calculation; BHP
V_{Sc}	knot	ship speed for calculation; V_{Sc}
θ_p	deg.	propeller pitch angle; θ_p
POCcheck	-	remark for the interpolation or the extrapolation for POC

No.	U_{wind}	γ	H_W	T_W	θ_W	H_S	T_S	θ_S	X_C	isele
	m/s	deg.	m	s	deg.	m	s	deg.		-
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	88.000	2 ▾
2	4.400	0.000	0.600	3.000	0.000	0.600	3.000	0.000	88.000	2 ▾
3	6.900	0.000	1.000	3.900	0.000	1.000	3.900	0.000	88.000	2 ▾
4	9.800	0.000	2.000	5.500	0.000	2.000	5.500	0.000	88.000	2 ▾
5	12.600	0.000	3.000	6.700	0.000	3.000	6.700	0.000	88.000	2 ▾
6	15.700	0.000	4.000	7.700	0.000	4.000	7.700	0.000	88.000	2 ▾
7	0.000	45.000	0.000	0.000	45.000	0.000	0.000	45.000	88.000	2 ▾
8	4.400	45.000	0.600	3.000	45.000	0.600	3.000	45.000	88.000	2 ▾
9	6.900	45.000	1.000	3.900	45.000	1.000	3.900	45.000	88.000	2 ▾

■ weatherボタン

■ サブインプットシート

✓ 風速・風向

✓ 有義波高・平均波周期・主波向（風波・うねり）

✓ 主機作動条件（回転数一定／フェーエルインデックス制御／出カ一定／船速一定 モード）

■ 方向波スペクトラムの入力も可能

計算

OCTARVIA
Prediction

PROGRAM MODE

OCTARVIA - Index
 OCTARVIA - Prediction
 Simulation for fouling and aging effect

CALCULATION ITEMS

(1) Evaluation of external forces

- (1-1) Added resistance in short crested irregular waves
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- (1-2) Wind force and moment coefficients
- (1-3) Hydrodynamic coefficients

(2) Performance simulator for ships in actual seas

Data Input Calculation Save Load Reset

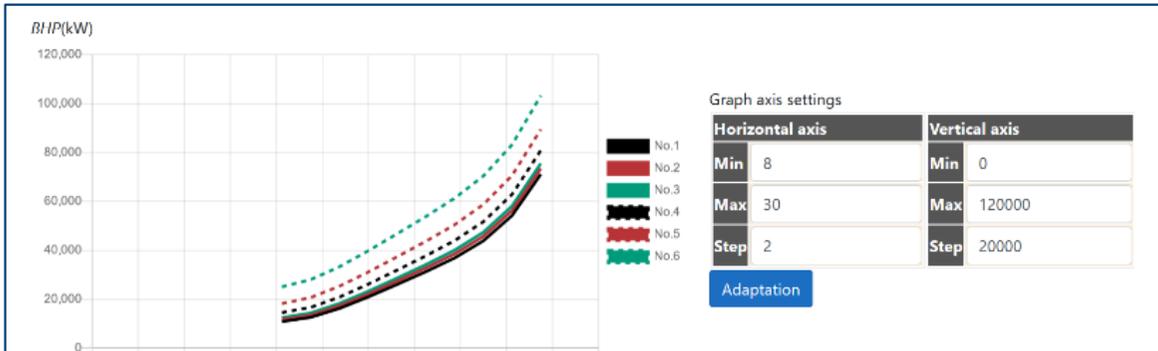
Import from SALVIA-OCT. Export for SALVIA-OCT.

Import from EAGLE-OCT.

■ Calculationボタン

- ✓ データ入力が済むとアクティブ

出力シート



■最終出力シート

✓実運航シミュレーション結果
(船速・出力・燃料消費量)

■中間出力シート

✓任意海象中パワーカーブ

✓外力推定結果

- 波浪中抵抗増加
- 風圧力
- 斜航流体力
- 舵力

Export

No.	U_{wind}	γ	H_w	T_w	θ_w	H_s	T_s	θ_s	X_c	V	β
	m/s	deg.	m	s	deg.	m	s	deg.		knot	de
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88.00	24.71	0.0
2	4.40	0.00	0.60	3.00	0.00	0.60	3.00	0.00	88.00	24.49	0.0
3	6.90	0.00	1.00	3.90	0.00	1.00	3.90	0.00	88.00	24.30	0.0
4	9.80	0.00	2.00	5.50	0.00	2.00	5.50	0.00	88.00	23.51	0.0

Export

No.	U_{wind}	γ
	m/s	deg.
1	0.00	0.00
1	0.00	0.00
1	0.00	0.00
1	0.00	0.00

V(knot)

Horizontal axis		Vertical axis	
Min	0	Min	0
Max	35	Max	30
Step	5	Step	5

BHP(kW)

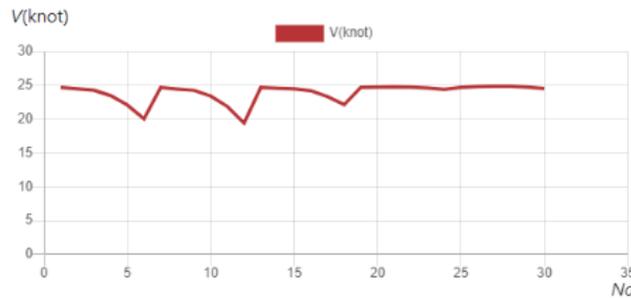
Horizontal axis		Vertical axis	
Min	0	Min	0
Max	35	Max	50000
Step	5	Step	5000

出力：最終出力シート

■ 任意海象下の実運航性能シミュレーション結果

Export

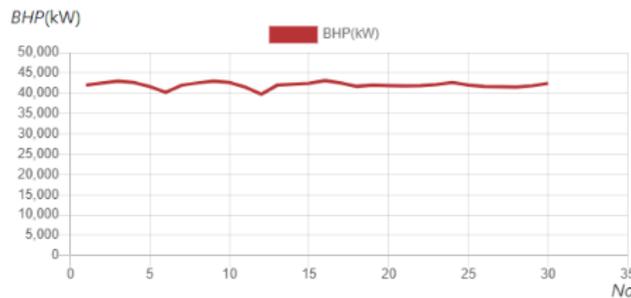
No.	U_{wind}	γ	H_w	T_w	θ_w	H_s	T_s	θ_s	X_c	V	β
	m/s	deg.	m	s	deg.	m	s	deg.		knot	deg.
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88.00	24.71	0.00
2	4.40	0.00	0.60	3.00	0.00	0.60	3.00	0.00	88.00	24.49	0.00



Graph axis settings

Horizontal axis		Vertical axis	
Min	0	Min	0
Max	35	Max	30
Step	5	Step	5

Adaptation



Graph axis settings

Horizontal axis		Vertical axis	
Min	0	Min	0
Max	35	Max	50000
Step	5	Step	5000

Adaptation



Graph axis settings

Horizontal axis		Vertical axis1	Vertical axis2
Min	0	Min	0
Max	35	Max	180
Step	5	Step	20
		Min	0
		Max	0.4
		Step	0.05

Adaptation

✓ 船速

✓ 主機出力

✓ 主機回転数

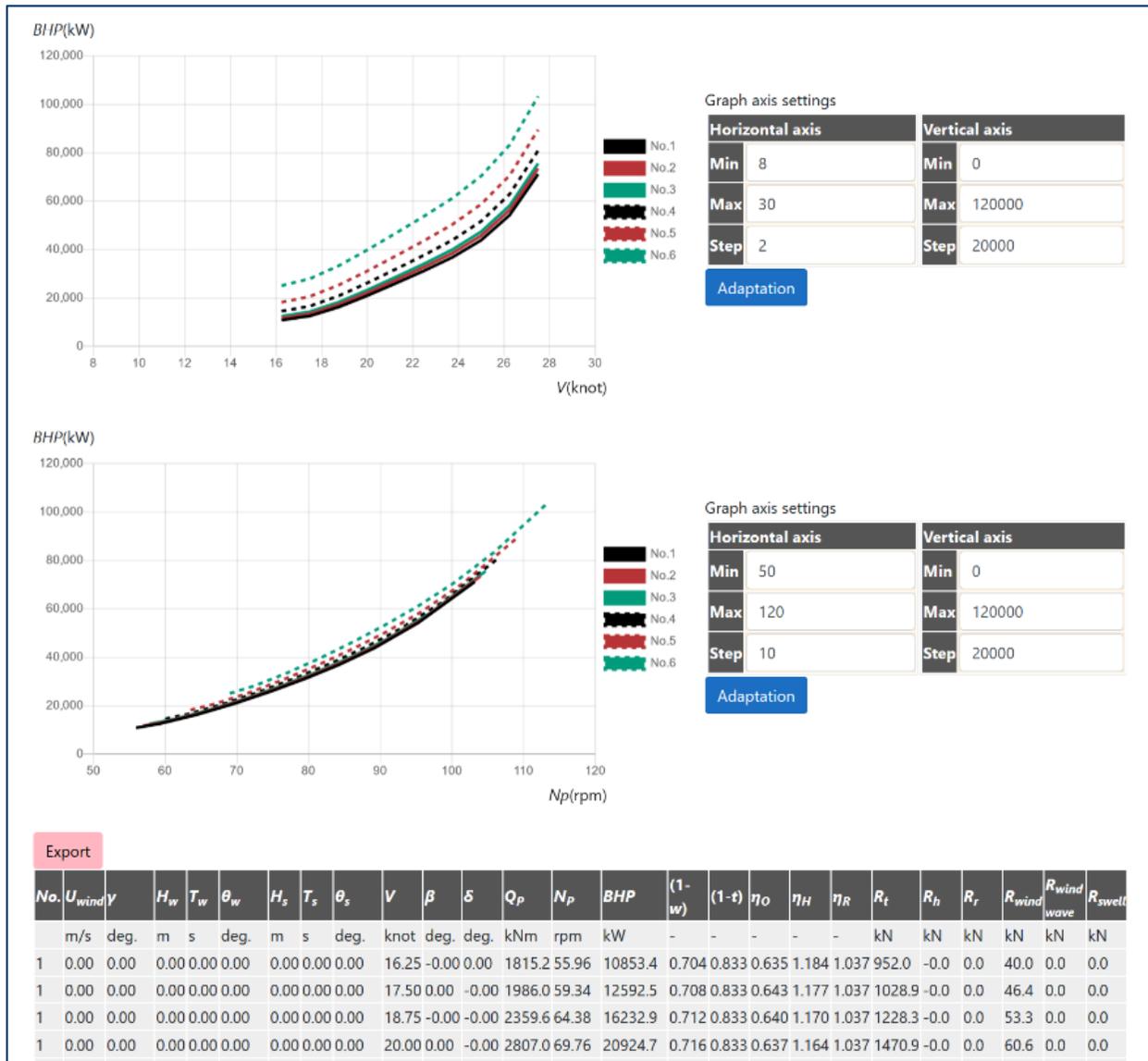
✓ 燃費

✓ 運動の分散値

出力：中間出力（任意海象中パワーカーブ）

■パワーカーブ

- ✓ 船速 – 主機出力 – 主機回転数の関係
- ✓ 入力した任意海象（風、風波、うねり）ごとに出力



出力 : 中間出力 (外力)

HydrodynamicView

Return Cancel

icxbb 0

$C_{x\beta}$ 0.0000

$C_{y\beta}$ 0.2036

$C_{x\beta\beta}$ 0.0000

$C_{y\beta\beta}$ 0.9125

$C_{n\beta}$ 0.0994

$C_{n\beta\beta}$ 0.0092

a_H 0.4028

κ_H -1.2753

γ_E 0.4301

C_{wR0} 0.4454

C_{wR1} 0.0000

C_{tR0} 0.7320

C_{tR1} 0.0000

V

m/s

8.4

14.1

Reflect

12

R_{wave_w}

$\frac{8\rho g H^2 B_{max}^2}{L_{ps}}$

Fn=0.265

300.0	-0.20176	-0.90027	-0.04048	-0.40480
310.0	-0.36653	-0.84607	-0.06004	-0.60040
320.0	-0.53761	-0.72971	-0.07076	-0.70760
330.0	-0.66821	-0.55914	-0.06876	-0.68760
340.0	-0.72425	-0.35981	-0.0536	-0.53600
350.0	-0.69718	-0.16384	-0.02867	-0.28670
360.0	-0.60397	0	0	0.00000

Reflect

CXwind, CYwind, 10CNwind

yr (deg.)

■ CXwind(i) ■ CYwind(i) ■ 10CNwind(i)

■ 外力推定結果

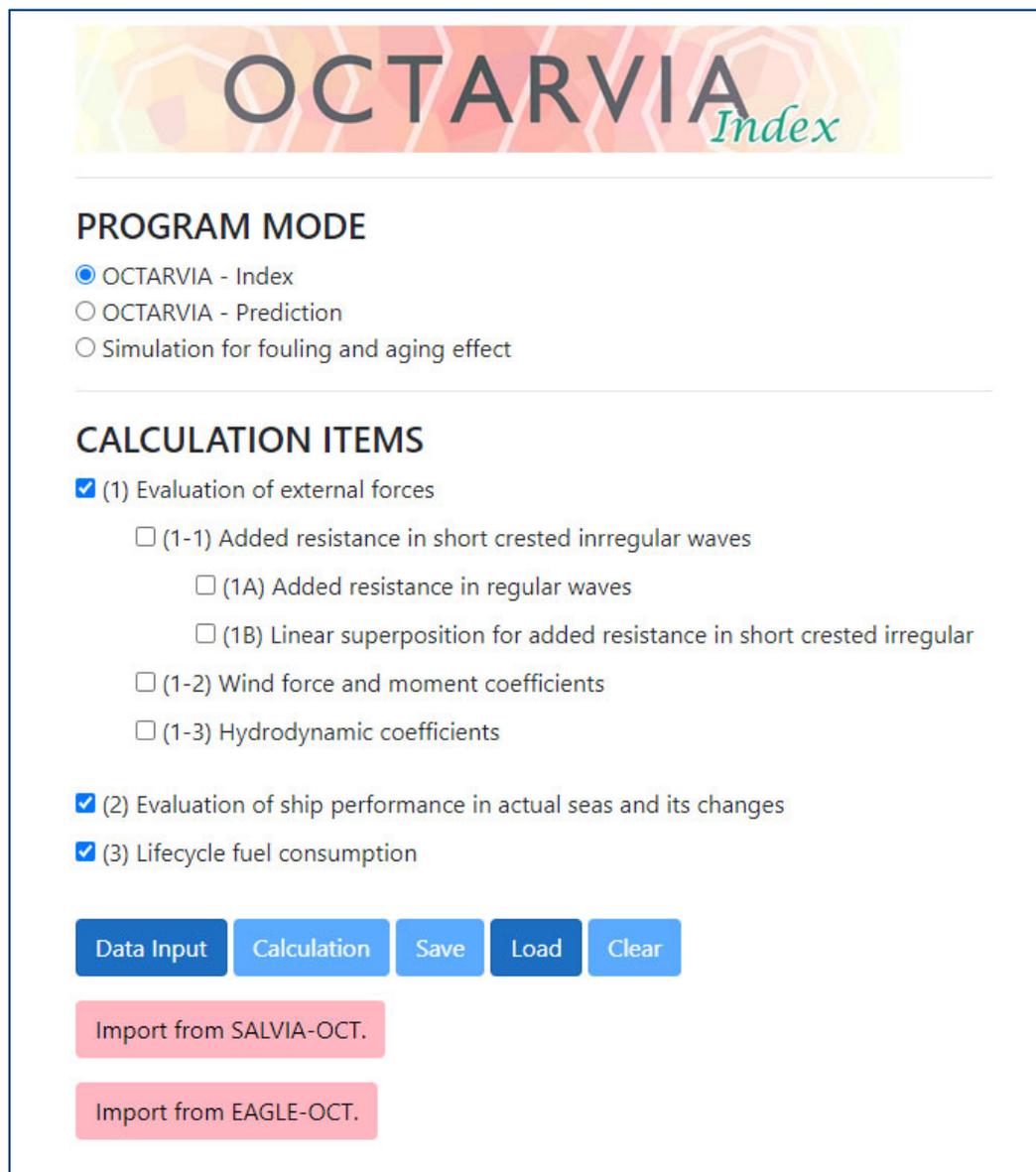
- ✓ 波浪定常力 (波浪中抵抗増加・定常横力・定常回頭モーメント)
- ✓ 風圧力係数
- ✓ 流体力微係数 (斜航流体力・舵力)

Predictionモードの機能

- OCTARVIA-web（Predictionモード）は、任意海象下の実運航性能シミュレーションを行うプログラムです
- 船型による差、主機作動条件の設定を考慮して、実海域性能の評価が可能です
- 外力算定結果を、ボタンクリックでSALVIA-OCT.-web（実船モニタリングデータ解析プログラム）の外乱修正に用いることができます

Indexモード

プログラムの構成(Indexモード)



OCTARVIA
Index

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CALCULATION ITEMS

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- (3) Lifecycle fuel consumption

Data Input Calculation Save Load Clear

Import from SALVIA-OCT.

Import from EAGLE-OCT.

■ Indexモードの計算項目

- ✓ 外力計算
- ✓ 実海域性能・経時変化の計算
- ✓ 指標（ライフサイクル燃料消費量）の計算

■ 計算の流れ

- ✓ 計算項目の選択
- ✓ 入力データの作成
- ✓ Calculation
- ✓ 出力の確認

データ入力

- メインインプットシート
- サブインプットシート
- ボタンリンク

OCTARVIA_INPUT

Weather

Route

Item	Value	Unit	Remarks
Route type	Single		Supposed route type - Single: Single route for year around - Combination(route): combination of multiple routes
$\Delta\eta_o$	%		deterioration of propeller efficiency in open water
ΔSFC	%		increase of specific fuel consumption

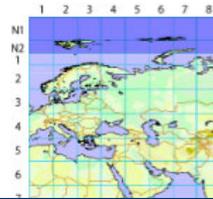
Single route

Item	Value
Route	North Pacific
L-route	4900

Remarks

Item	Unit	Remarks
Route	-	St
L-route	NM	Le
Rate for routes and seasons	%	C
L-route	%	C

Reflect the routes



Conditions

ship type

item	Value	Unit	Remarks
ship type	Container ship		Ship type to be selected from [Bulk carrier, Gas carrier, Tanker, Container ship, General cargo ship, Refrigerated cargo carrier, Combination carrier, LNG carrier, Ro-ro cargo ship (vehicle carrier), Ro-ro cargo ship, Ro-ro passenger ship, Cruise passenger ship having non-conventional propulsion]

Loading conditions

voy1

Item	Value	Unit
Amount of cargo for voy1	80000	ton
TEU for voy1	6500	TEU

voy2

same condition with voy1 for performance simulator

Engine

INPUT for engine characteristics

Item	Value	Unit	Remarks
EC _{EO}	non	-	Evaluation condition for switching engine operation condition
isele	4	-	Selector of engine operating condition [1: constant revolution, 2: fuel index, 3: constant power, 4: constant ship speed]
V _{SC_voy1}	20	knot	Ship speed for voy1

Propeller

入力 : Route, weather (1/2)

Route type : 以下から選択

- ✓ Single : 代表航路 1 種類を選択
- ✓ Combination (route) : 各航路の寄与を%で入力
- ✓ Combination (route-season) : 各航路の季節ごとの寄与を%で入力
- ✓ Other : 気象海象の確率分布を直接設定

Weather

Route

Item	Value	Unit	Remarks
Route type	Single	-	Supposed route type - Single: Single route for year around - Combination(route): combination of multiple routes - Combination(route-season): combination of multiple routes per season - Other: Not supposition for a route (direct input of weather condition)

Single route

Item	Value	Unit
Route	North Pacific	-
L _{route}	4900	NM

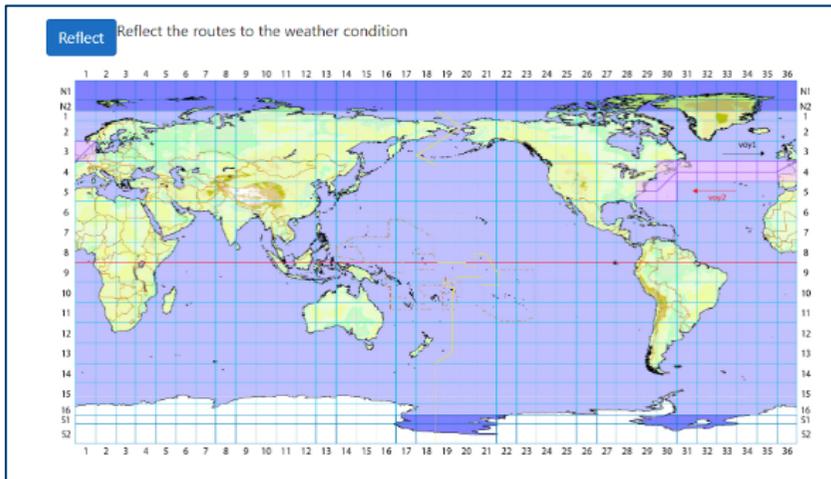
Combination of multiple routes

Route	r _{route} [%]	L _{route} [N/M]
North Pacific	50	4900
West Pacific	50	4400
Asia-Europe via Suez	0	12200
Asia-Europe via Cape	0	15400
North Atlantic	0	4600
Asia-Middle East	0	6700
Total	100	
Average		4650

Combination of multiple routes per season

Route	Rate for routes per season[%]				r _{route} [%]	L _{route} [N/M]
	Spring	Summer	Autumn	Winter		
North Pacific	25	25	0	0	50	4900
West Pacific	0	0	0	25	25	4400
Asia-Europe via Suez	0	0	25	0	25	12200
Asia-Europe via Cape	0	0	0	0	0	15400
North Atlantic	0	0	0	0	0	4600
Asia-Middle East	0	0	0	0	0	6700
Total	25	25	25	25	100	
Annual average						6600

入力 : Route, weather (2/2)

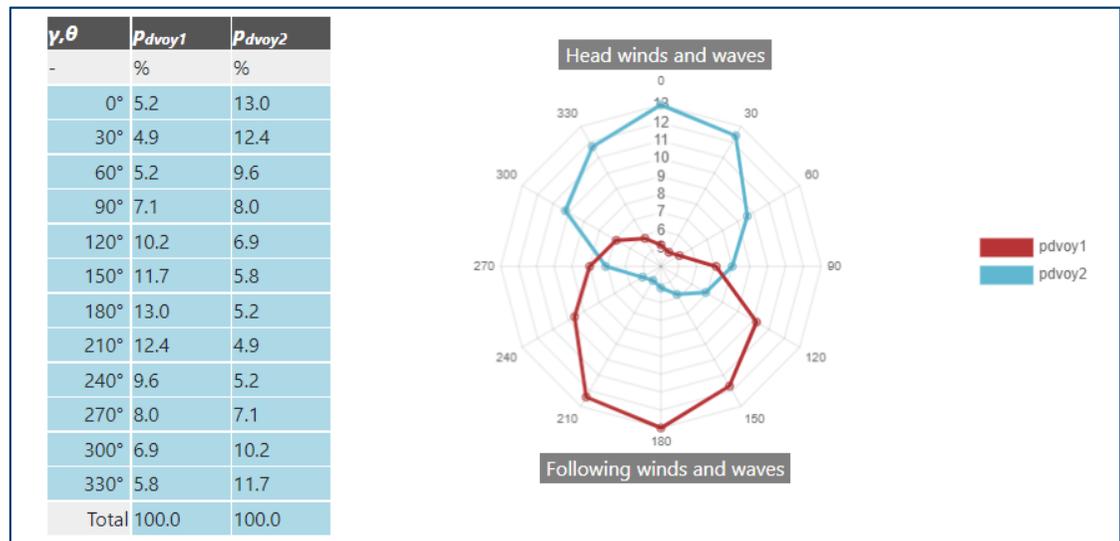


Reflectボタン

✓ 想定航路の図示

✓ 確率分布を図表で表示

- 風速・有義波高・平均波周期の組合せ
- 平均風向・主波向の組合せ



入力：ライフサイクル評価に関するパラメータ(1/2)

Parameters For Life-cycle Fuel Consumption Section

Mode

Item	Value	Unit	Remarks
ModeLAF	Linear model	-	Mode for the evaluation of aging and fouling - Linear model: Linear formulae are applied. (input of specific parameters) - Input: An arbitrary pattern for aging and fouling is used. (direct input of time and parameters in the right table.)

Specific parameters

Item	Value	Unit	Remarks
$p_{as}(R)$	0.3	%/year	Aging deterioration for hull (increase ratio due to aging of hull resistance)
$p_{ag}(SFC)$	0.1	%/year	Aging deterioration for engine governor (increase ratio of SFC)
$p_{fs}(R)$	0.5	%/year	Fouling deterioration for hull (increase ratio due to fouling of hull resistance)
$p_{fp}(\eta)$	0.4	%/year	Fouling deterioration for propeller (deterioration ratio of propeller efficiency in open water)
r_{pas}	0	%	Retrieval percentage on aging deterioration for a hull per cleaning interval
r_{pfs}	100	%	Retrieval percentage on fouling deterioration for a hull per cleaning interval
r_{pfp}	100	%	Retrieval percentage on fouling deterioration for a propeller per cleaning interval
T_{ch}	Combi. 2 and 3	year	Cleaning interval for hull (combination of 2 and 3 years or an arbitrary interval) (ΔT_{ch} must be a multiple number of ΔT_E)
T_{cp}	Combi. 2 and 3	year	Cleaning interval for propeller (combination of 2 and 3 years or an arbitrary interval) (ΔT_{cp} must be a multiple number of ΔT_E)
T_E	15	year	Evaluation period ($1 \leq T_E \leq 25$)
ΔT_E	1	year	Evaluation period ($0.25 \leq \Delta T_E \leq T_E$) Select from the dropdown list. (ΔT_E must divide ΔT_{ch} and ΔT_{cp} , and must be smaller than them.)

■ 経年劣化・生物汚損パラメータ
: 悪化率・クリーニング回復率

✓ 船体抵抗

✓ 燃料消費率

✓ プロペラ効率

■ クリーニング間隔

✓ 船体

✓ プロペラ

■ 評価期間

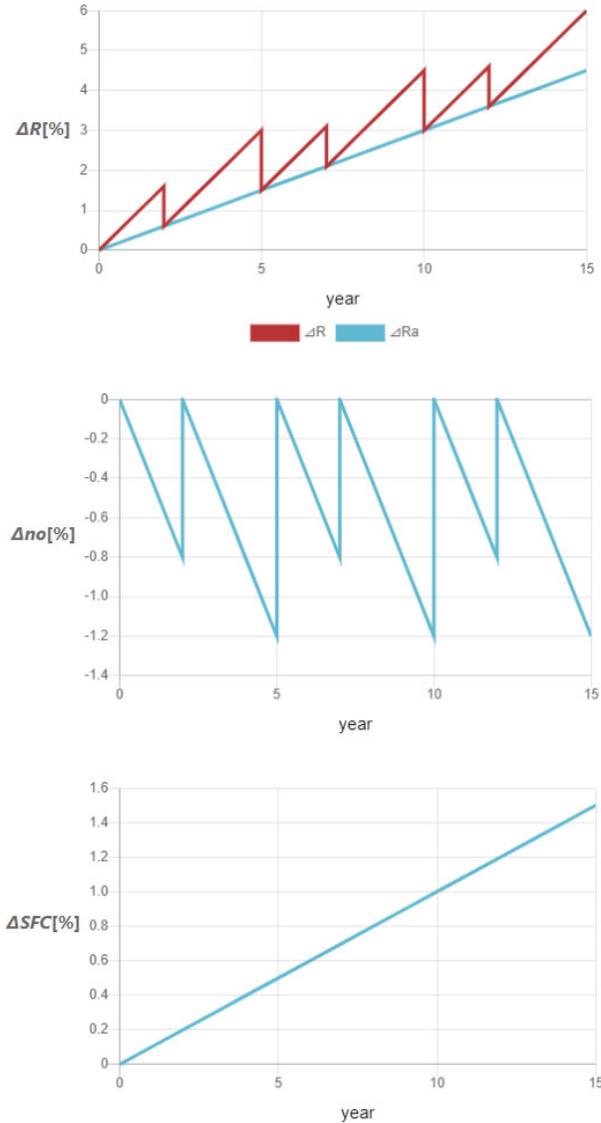
■ 経時変化計算間隔

入力：ライフサイクル評価に関するパラメータ(2/2)

Time variation of aging and fouling effects

Reflect

T	B/A	ΔR_a	ΔR_f	ΔR	$\Delta \eta_o$	ΔSFC
year	-	%	%	%	%	%
0	-	0.00	0.00	0.00	0.00	0.00
1	-	0.30	0.50	0.80	-0.40	0.10
2	(b)	0.60	1.00	1.60	-0.80	0.20
2	(a)	0.60	0.00	0.60	0.00	0.20
3	-	0.90	0.50	1.40	-0.40	0.30
4	-	1.20	1.00	2.20	-0.80	0.40
5	(b)	1.50	1.50	3.00	-1.20	0.50
5	(a)	1.50	0.00	1.50	0.00	0.50
6	-	1.80	0.50	2.30	-0.40	0.60
7	(b)	2.10	1.00	3.10	-0.80	0.70
7	(a)	2.10	0.00	2.10	0.00	0.70
8	-	2.40	0.50	2.90	-0.40	0.80
9	-	2.70	1.00	3.70	-0.80	0.90
10	(b)	3.00	1.50	4.50	-1.20	1.00
10	(a)	3.00	0.00	3.00	0.00	1.00
11	-	3.30	0.50	3.80	-0.40	1.10
12	(b)	3.60	1.00	4.60	-0.80	1.20
12	(a)	3.60	0.00	3.60	0.00	1.20
13	-	3.90	0.50	4.40	-0.40	1.30
14	-	4.20	1.00	5.20	-0.80	1.40
15	(b)	4.50	1.50	6.00	-1.20	1.50



Reflectボタン

✓ 各要素の経時変化を図表で表示

- 船体抵抗
- プロペラ効率
- 燃料消費率

入力：船型データ

ship geometry

Item	Value	Unit	Remarks
Builder	NMRI	-	builder (within 50 characters)
Type	CONT	-	type of ship (within 50 characters)
ID	762		
L_{ps}	300		
L_{OA}	318		
B_{max}	40		
d_{mid}	14		
d_{aft}	14		
d_{fore}	14		
L_A	0		
k_{yy}/L_{ps}	0.25		
k_{zz}/L_{ps}	0.25		
X_G	-1.7715		
O_G	2.45		
G_M	1.22		
T			

S.S.	$d(i)$	$B(i)/2$	$A(i)$	$H_0(i)$	$\sigma(i)$	σ_{upper}	σ_{lower}	LF check
-	m	m	m ²	-	-	-	-	-
0.000	0.010	0.010	0.0001	1.000	0.500	1.178	0.295	in
0.500	8.000							
1.000	14.000							
1.500	14.000							
2.000	14.000							
2.500	14.000							
3.000	14.000							
3.500	14.000							
4.000	14.000							

■ 往路・復路それぞれ入力

■ サブインプットシート

■ 図で形状を確認

✓ 要目データ

✓ 横断面形状パラメータ

✓ 水線面形状

Return Cancel Reflect

input

CHECK bluntness coefficient This button requires following input data; B , isp , $nd0$, $x(i)$ and $B(i)$.

$nd0$ 100 -

$nd0$ - number of section for calculating Bluntness coefficient (A.P. to F.P.) ($nd0 \leq 1001$)

$x(i)$ m position of the section (+ means fore from midship) ($i=1,2,\dots,nd0$)

$B(i)$ m sectional breadth at L.W.L. ($i=1,2,\dots,nd0$)

$x(i)$	$B(i)$	$B(i)/2$	$-B(i)/2$
m	m	m	m
-150.000	0.010	0.005	-0.005
-146.970	4.807	2.404	-2.404
-143.939	9.214	4.607	-4.607
-140.909	13.244	6.622	-6.622
-137.879	16.915	8.457	-8.457
-134.848	20.242	10.121	-10.121

入力：主機作動条件

Engine

Engine INPUT for engine characteristics

Item	Value	Unit	Remarks
EC_{EO}	non	-	Evaluation condition for switching engine operation condition
$isele$	4	-	Selector of engine operating condition [1: constant revolution, 2: fuel index, 3: constant power, 4: constant ship speed]
V_{SC_voy1}	20	knot	Ship speed for voy1

■ Engineボタン（サブインプットシート）

✓燃料消費率

✓トルクリミットパラメータ

■ 往路・復路それぞれ入力

■ EC_{EO}

✓主機作動条件をスイッチする評価海象番号を指定

■ $isele$

✓主機作動条件セレクター

✓回転数一定／フューエルインデックス制御／出力一定／船速一定 モード から選択

計算

OCTARVIA *Index*

PROGRAM MODE

OCTARVIA - Index
 OCTARVIA - Prediction
 Simulation for fouling and aging effect

CALCULATION ITEMS

(1) Evaluation of external forces

- (1-1) Added resistance in short crested irregular waves
 - (1A) Added resistance in regular waves
 - (1B) Linear superposition for added resistance in short crested irregular
- (1-2) Wind force and moment coefficients
- (1-3) Hydrodynamic coefficients

(2) Evaluation of ship performance in actual seas and its changes

(3) Lifecycle fuel consumption

■ Calculationボタン

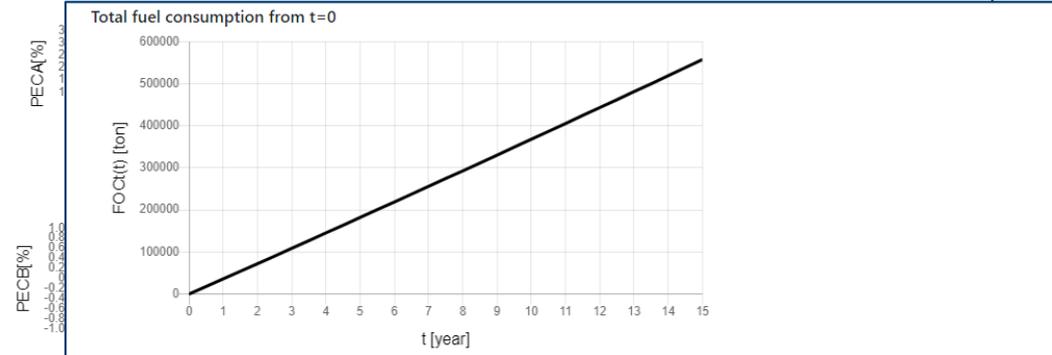
✓データ入力が済むとアクティブ

出カシート

Standard input model was applied for the Index calculation.

OUTPUT FOR OCTARVIA

Supposed weather condition for year around



Remarks

Item	Unit	Remarks
t	year	Time in year
$V_{ave}(t)$	knot	Ship speed averaged in each time interval
$FPD_{ave}(t)$	ton/day	Ship speed averaged in time interval for voy2
$FOC_t(t)$	ton	Total fuel consumption from t=0
links for the details Links to detailed outputs of a performance for voy1 and voy2 by time intervals		

INDEX of the ship performance in actual seas

INDEX

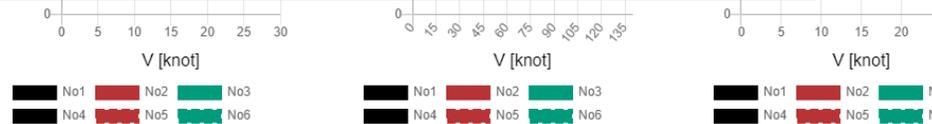
Item	Value	Unit	Remarks
Lifecycle Fuel Consumption	101.68	ton/day	Fuel consumption per day averaged throughout life

Elements

Item	Value	Unit	Remarks
Total fuel consumption	5.570E+05	ton	Total fuel consumption throughout life
Total amount of cargo	4.284E+07	ton	Total amount of cargo delivered throughout life
Total distance for transport work	2.624E+06	mile	Total distance for transport work throughout life

Sub-Indexes

Item	Value	Unit	Remarks
Fuel consumption per ton-mile	0.0050	g/(ton-mile)	Fuel consumption per cargo and distance for transport work throughout life
Fuel consumption per day per TEU	0.01560	(ton/day)/TEU	Fuel consumption per day per TEU averaged throughout life (for container ship)



■ 最終出力シート

- ✓ ライフサイクル燃料消費量
- ✓ ライフサイクルパラメータ（総距離、総輸送量）
- ✓ 船速・燃料消費量の経時変化

■ 中間出力シート

- ✓ 評価海象中パワーカーブ
- ✓ 評価海象中短期予測
- ✓ 外力推定結果

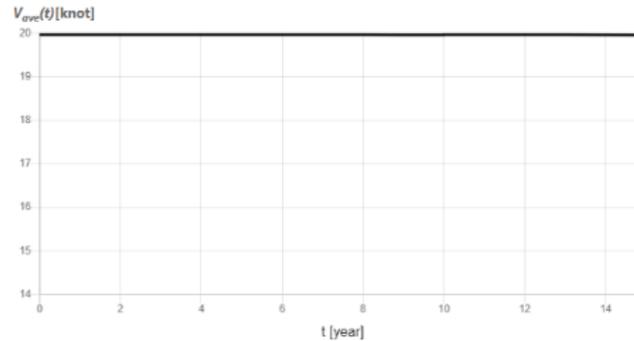
- 波浪中抵抗増加
- 風圧力
- 斜航流体力
- 舵力

出力：最終出力シート(1/2)

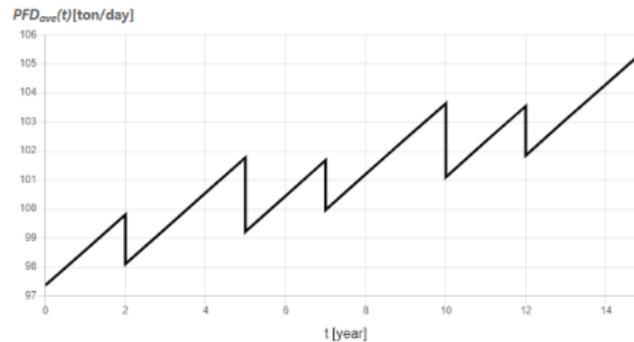
Time Variation

t	Vave(t)	FPDave(t)	FOCt(t)	links for the details	
year	knot	ton/day	ton		
0.00	19.96	97.81	0.00	voy1_0	voy2_0
1.00	19.96	99.02	35920.27	voy1_1	
2.00	19.96	100.23	72283.60	voy1_2	
2.00	19.96	98.55	72283.60	voy1_3	
3.00	19.96	99.76	108474.59	voy1_4	
4.00	19.96	100.98	145159.64	voy1_5	
5.00	19.95	102.17	182283.73	voy1_6	
5.00	19.96	99.66	182283.73	voy1_7	
6.00	19.96	100.88	218882.75	voy1_8	
7.00	19.96	102.08	255924.14	voy1_9	
7.00	19.96	100.40	255924.14	voy1_10	
8.00	19.96	101.63	292845.73	voy1_11	
9.00	19.95	102.83	330209.95	voy1_12	
10.00	19.95	104.00	367957.13	voy1_13	
10.00	19.96	101.53	367957.13	voy1_14	
11.00	19.96	102.74	405235.97	voy1_15	
12.00	19.95	103.94	443006.99	voy1_16	
12.00	19.96	102.28	443006.99	voy1_17	
13.00	19.96	103.49	480610.56	voy1_18	
14.00	19.95	104.67	518598.80	voy1_19	
15.00	19.95	105.88	557023.98	voy1_20	

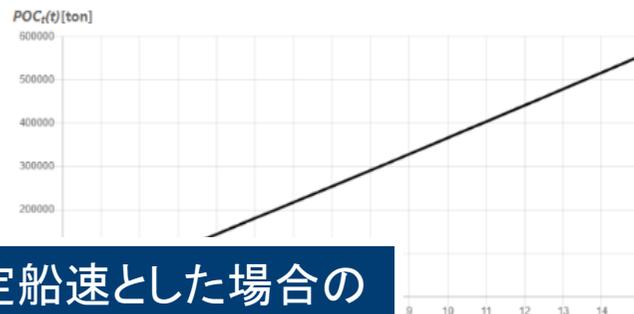
Ship speed average in each time interval



Fuel consumption per day averaged in each time interval



Total fuel consumption from t=0



■ 経時変化

- ✓ 船速
- ✓ 1日当たりの燃料消費量
- ✓ 累積燃料消費量

経年劣化パラメータ・クリーニングの設定を反映した経時変化
 → **メンテナンス計画の最適化**を図ることができる

主機作動条件を一定船速とした場合の計算結果

出力：最終出力シート(2/2)

INDEX of the ship performance in actual seas

INDEX

Item	Value	Unit	Remarks
Lifecycle Fuel Consumption	101.68	ton/day	Fuel consumption per day averaged throughout life

Elements

Item	Value	Unit	Remarks
Total fuel consumption	5.570E+05	ton	Total fuel consumption throughout life
Total amount of cargo	4.284E+07	ton	Total amount of cargo delivered throughout life
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Sub-Indexes

Item	Value	Unit	Remarks
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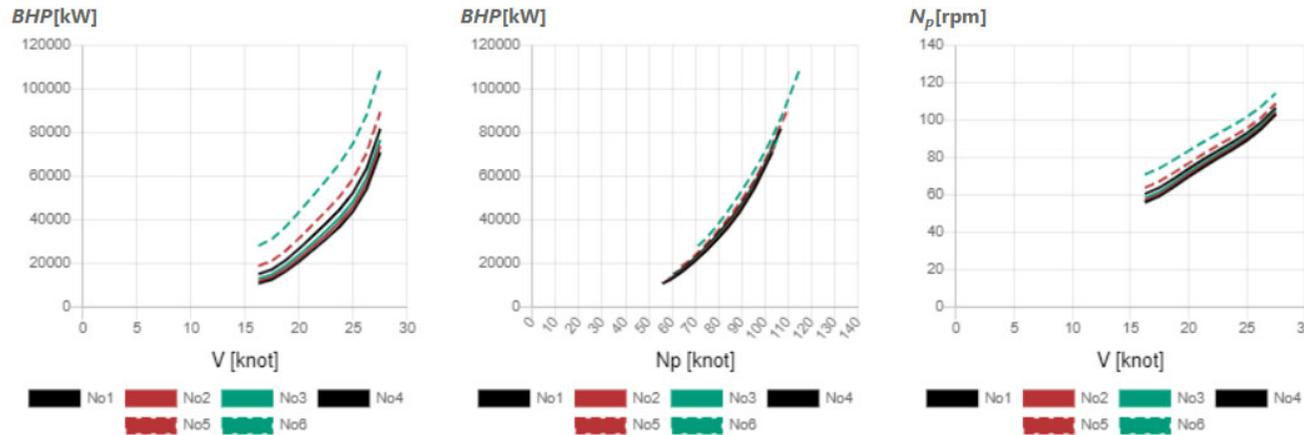
航路（海象）、経年劣化、船型差、主機条件を考慮した実海域実船性能の定量的評価
→ 燃料消費量（コストに直結するパラメータ）で評価が可能

■ 実海域実船性能評価指標

- ✓ ライフサイクル燃料消費量（1日当たりの平均燃料消費量）
- ✓ ライフサイクルパラメータ（総燃料消費量、総輸送量、総輸送距離）
- ✓ 輸送効率（トンマイル当たりの燃料消費量、コンテナ船：TEU当たりの燃料消費量、自動車運搬船：1台当たりの燃料消費量）

出力：中間出力（評価海象中パワーカーブ）

Power curve



Remarks

Item	Unit	Remarks
U_{wind}	m/s	Mean wind speed
γ	deg.	Mean wind direction (0 deg. means head winds.)
H	m	Significant waves height
T	s	Mean wave period
θ	deg.	Primary wave direction (0 deg. means head waves.)
V	knot	ship speed
Q_p	kNm	propeller torque
N_p	rpm	propeller revolution
BHP	kW	brake power
$(1-w)$	-	wake coefficient
$(1-t)$	-	thrust deduction coefficient
η_o	-	propeller efficiency in open water
η_H	-	hull efficiency
η_R	-	relative rotative efficiency
R_t	kN	total resistance in still water
R_h	kN	resistance increase due to drift
R_r	kN	resistance increase due to steering
R_{wind}	kN	resistance due to winds, including resistance caused by ship running
$R_{wind waves}$	kN	resistance increase due to wind waves

No	U_{wind}	γ	H	T	θ	V	β	δ	Q_p	N_p	BHP	$(1-w)$	$(1-t)$	η_o	η_H	η_R	R_t	R_h	R_r	R_{wind}	$R_{wind waves}$
1	0	0	0	0	0	16.25	0	0	1815.158	55.956	10853.4	0.7039	0.8332	0.6352	1.1836	1.037	952.0	-0	0	40.0	0

■パワーカーブ

- ✓ 船速－主機出力－主機回転数の関係
- ✓ 平水中及び評価海象（EC1~6)中を平均風向・主波向（30度刻み）ごとに出力

評価海象ごとのパワーカーブ
→ 海象影響の分析が可能

穏やかな海象で性能が良い
荒天下で性能が良い
斜向からの波風に強い
・・・など

出力：中間出力（短期予測）

■ 短期予測結果

- ✓ 船速・1日当たりの燃料消費量
- ✓ 平水中及び評価海象（EC1~6）中を平均風向・主波向（30度刻み）ごとに出力

■ 期待値（長期予測結果）

- ✓ 評価海象の確率分布と掛け合わせた値

Performance

Ship speed and Fuel consumption

EC	U_{wind}	H	T_A	Ship speed[knot]								Fuel consumption per day [ton/day]							
				Winds and waves direction								Winds and waves direction							
-	m/s	m	s	0°	30°	60°	90°	120°	150°	180°	0°	30°	60°	90°	120°	150°	180°		
0.00	0.00	0.00	0.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	85.80	85.80	85.80	85.80	85.80	85.80	85.80		
1.00	4.40	1.25	4.30	20.00	20.00	20.00	20.00	20.00	20.00	20.00	91.44	92.03	90.92	88.57	86.07	84.32	83.43		
2.00	6.90	2.00	5.50	20.00	20.00	20.00	20.00	20.00	20.00	20.00	97.22	98.30	95.99	91.16	86.47	83.80	82.89		
3.00	9.80	3.00	6.70	20.00	20.00	20.00	20.00	20.00	20.00	20.00	108.25	110.20	105.87	96.61	88.14	84.11	83.36		
4.00	12.60	4.00	7.70	20.00	20.00	20.00	20.00	20.00	20.00	20.00	126.40	129.21	121.32	105.16	91.59	86.20	84.96		
5.00	15.70	5.50	9.10	20.00	20.00	20.00	20.00	20.00	20.00	20.00	172.74	174.22	154.06	121.79	99.16	91.86	89.71		
6.00	19.00	7.00	10.20	14.95	14.96	18.73	20.00	20.00	20.00	20.00	135.46	135.59	168.95	141.39	109.04	98.80	96.05		

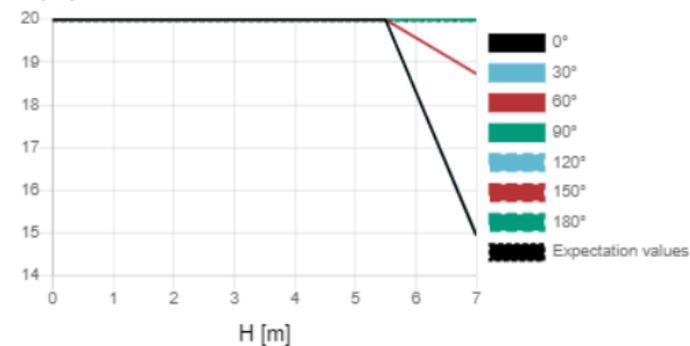
EC	U_{wind}	H	T_B	Ship speed[knot]								Fuel consumption per day [ton/day]							
				Winds and waves direction								Winds and waves direction							

Expectation values

Item	Value	Unit	Remarks
$V_{ave}(t, ID_{voy})$	19.9711	knot	Ship speed averaged in time interval for voy1 or voy2
$FPD_{ave}(t, ID_{voy})$	95.6351	ton/day	Fuel consumption per day averaged in time interval for voy1 or voy2

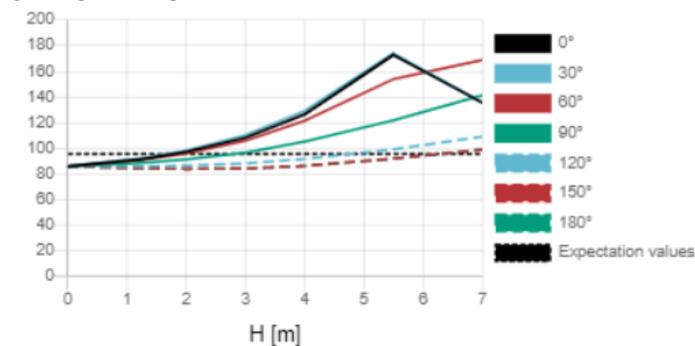
for T_A

Ship speed [knot]



for T_A

Fuel consumption per day [ton/day]



for T_B

Ship speed [knot]

for T_B

Fuel consumption

トルクリミットを考慮した短期予測
→ 海象影響による自然減速、燃費変化の把握が可能

出力：中間出力（外力）



■外力推定結果

✓往路・復路の载荷状態ごと推定

- 波浪定常力（波浪中抵抗増加・定常横力・定常回頭モーメント）
- 風圧力係数
- 流体力微係数（斜航流体力・舵力）

物理モデルによる外力評価
→ 船型差の影響の考慮が可能

波、風、斜航、当舵の影響を推定
→ 要素ごとの分析が可能

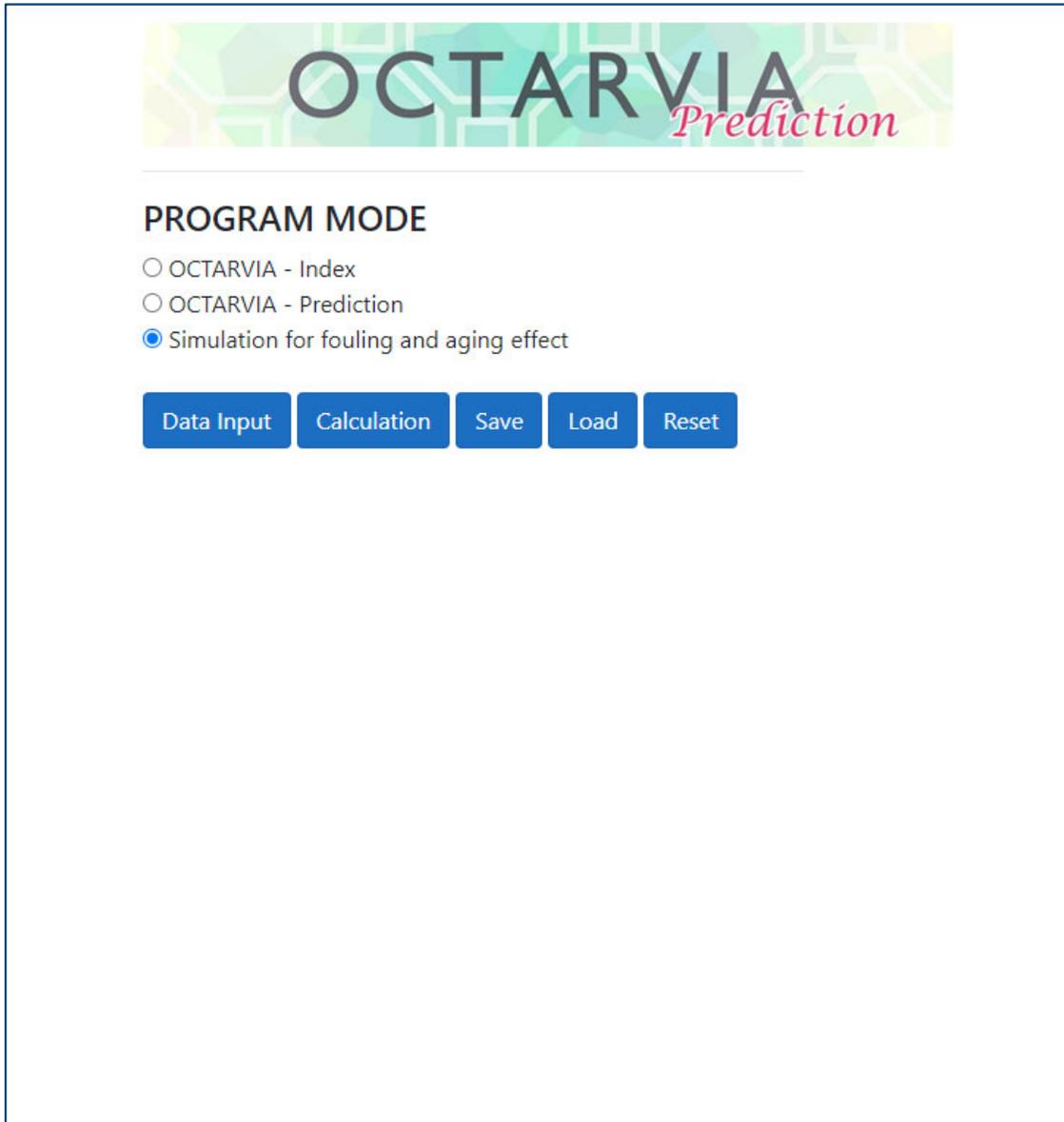
波浪中抵抗増加の影響で横波中の性能が変化
波より風の影響が卓越している
・・・など

Indexモードの機能

- OCTARVIA-web(Indexモード) は、**実海域実船性能評価指標**（**ライフサイクル主機燃料消費量**）を計算するプログラムです
- **航路・海象の影響**、**経年劣化の影響**・**クリーニング間隔の影響**、**船型**による差、**主機作動条件**の設定を考慮して、**ライフサイクル主機燃料消費量**を算出することが可能です
- コストに直結するパラメータ（**主機燃料消費量**）で**定量的**評価を行うことで、設計データ（**船型**、**平水中性能**）の評価と同時に**メンテナンス計画**の最適化、**減速**の評価などの**運航計画の最適化**についても検討することができます

Simulation for fouling and aging effectモード

プログラムの構成(Simulation for fouling and aging effectモード)



The screenshot shows the OCTARVIA Prediction software interface. At the top, the logo 'OCTARVIA Prediction' is displayed. Below the logo, the 'PROGRAM MODE' section contains three radio button options: 'OCTARVIA - Index', 'OCTARVIA - Prediction', and 'Simulation for fouling and aging effect', which is currently selected. At the bottom of the interface, there are five blue buttons: 'Data Input', 'Calculation', 'Save', 'Load', and 'Reset'.

■ 計算の流れ

- 計算項目の選択
- 入力データの作成
- Calculation
- 出力の確認

データ入力

ship geometry

Item	Value	Unit	Remarks
Builder	NMRI	-	builder (within 50 characters)
Type	CONT	-	type of ship (within 50 characters)
ID	762	-	ship ID number
L_{ps}	300	m	length between fore position of water line and A.P./aft position of water line; L_{ps}
L_{OA}	318	m	length overall ($L_{OA} \geq L_{ps}$); L_{OA}
B_{max}	40	m	maximum breadth; B_{max}
d_{mid}	14	m	draft at midship; d_{mid}
A_T	1546.67	m ²	projected transverse area
A_L	9018.67	m ²	projected lateral area above
C_{dis}	-11.34	m	distance from the midship; C_{dis}

ship speed

Item	Value
V_S	25

wind force

Item	Value	Unit
IDCX	Fujiwara's formula	-
C_{Xwind0}	-0.604	-

- メインインプットシート
- サブインプットシート
 - ボタンリンク

resistance in still water

[resistance in still water](#)

Engine

Item	Value	Unit	Remarks
η_s	0.98	-	transmission efficiency; η_s
gear	1	-	gear ratio: gear ($N_p = gear N_g$)

Propeller

[propeller](#)

self propulsion factors

[self propulsion factors](#)

FAsim-in

[FAsim-in](#)

入力：船型データ

ship geometry

Item	Value	Unit	Remarks
Builder	NMRI	-	builder (within 50 characters)
Type	CONT	-	type of ship (within 50 characters)
ID	762	-	ship ID number
L_{ps}	300	m	length between fore position of water line and A.P./aft position of water line; L_{ps}
L_{OA}	318	m	length overall ($L_{OA} \geq L_{ps}$); L_{OA}
B_{max}	40	m	maximum breadth; B_{max}
d_{mid}	14	m	draft at midship; d_{mid}
A_T	1546.67	m ²	projected transverse area above water line; A_T
A_L	9018.67	m ²	projected lateral area above water line; A_L
C_{dis}	-11.34	m	distance from the midship section to the center of projected lateral area (+ means fore from midship); C_{dis}

ship speed

Item	Value	Unit	Remarks
V_S	25	knot	designated ship speed; V_S

■ メインインプットシート

✓ 要目データ

✓ 船速

入力：船舶性能データ

wind force

Item	Value	Unit	Remarks
<i>IDCX</i>	Fujiwara's formula	-	selector for the drag coefficient due to winds
<i>C_{Xwind0}</i>	-0.604	-	drag coefficient due to head winds (+ means thrust.)

resistance in still water

resistance in still water

Engine

Item	Value	Unit	Remarks
<i>η_s</i>	0.98	-	transmission efficiency; η_s
<i>gear</i>	1	-	gear ratio; gear ($N_p = gear N_e$)

Propeller

propeller

self propulsion factors

self propulsion factors

- メインインプットシート
 - ✓ 風圧力係数（向風）
 - ✓ 主機伝達係数・ギア比
- resistance in still water ボタン
 - ✓ 平水中抵抗
- Propeller ボタン
 - ✓ プロペラ直径
 - ✓ プロペラ単独性能
- self propulsion factors ボタン
 - ✓ 平水中自航要素

入力：経年劣化・生物汚損パラメータ

Input for the estimation of fouling and aging effects

Item	Value	Unit	Remarks
k_0	2012 / 07 / 19	YYYY/MM/DD	Start day of service
n_{dc}	4	-	Number of dock-interval ($1 \leq n_{dc} \leq 10$)

Parameters of deterioration and retrieval

Item	Unit	Remarks
$No. (i)$	-	Number of dock intervals for the cleaning of a hull or a propeller
$k_{out}(i)$	YYYY/MM/DD	Date of dock-out after the cleaning
$k_{in}(i)$	YYYY/MM/DD	Date of dock-in for the cleaning
$p_{as}(i)$	%/year	Aging deterioration for a hull (increase ratio due to aging of hull resistance) for each dock interval
$p_{fs}(i)$	%/year	Fouling deterioration for a hull (increase ratio due to fouling of hull resistance) for each dock interval
$p_{fp}(i)$	%/year	Fouling deterioration for a propeller (deterioration rate of propeller efficiency in open water) for each dock interval
$r_{pas}(i)$	%	Retrieval percentage on aging deterioration for a hull by the cleaning after $k_{in}(i)$
$r_{pfs}(i)$	%	Retrieval percentage on fouling deterioration for a hull by the cleaning after $k_{in}(i)$
$r_{pfp}(i)$	%	Retrieval percentage on fouling deterioration for a propeller by the cleaning after $k_{in}(i)$

Import Export

No. (i)	$k_{out}(i)$	$k_{in}(i)$	$p_{as}(i)$	$p_{fs}(i)$	$p_{fp}(i)$	$r_{pas}(i)$	$r_{pfs}(i)$	$r_{pfp}(i)$
-	YYYY/MM/DD	YYYY/MM/DD	%/year	%/year	%/year	%	%	%
1	2012 / 07 / 19	2014 / 06 / 01	0.2	0.1	0.08	100	0	100
2	2014 / 06 / 05	2016 / 12 / 10	0.5	0.1	0.2	0	0	100
3	2016 / 12 / 15	2019 / 01 / 10	0.4	0.1	0.15	100	0	0
4	2019 / 01 / 23	2022 / 01 / 23	0.25	0.1	0.1	0	0	0

■ FAsim-inボタン (サブインプットシート)

✓ 就航年月日

✓ ドックインのタイミング

✓ 悪化率・クリーニング回復率

- 船体抵抗

- 燃料消費率

- プロペラ効率

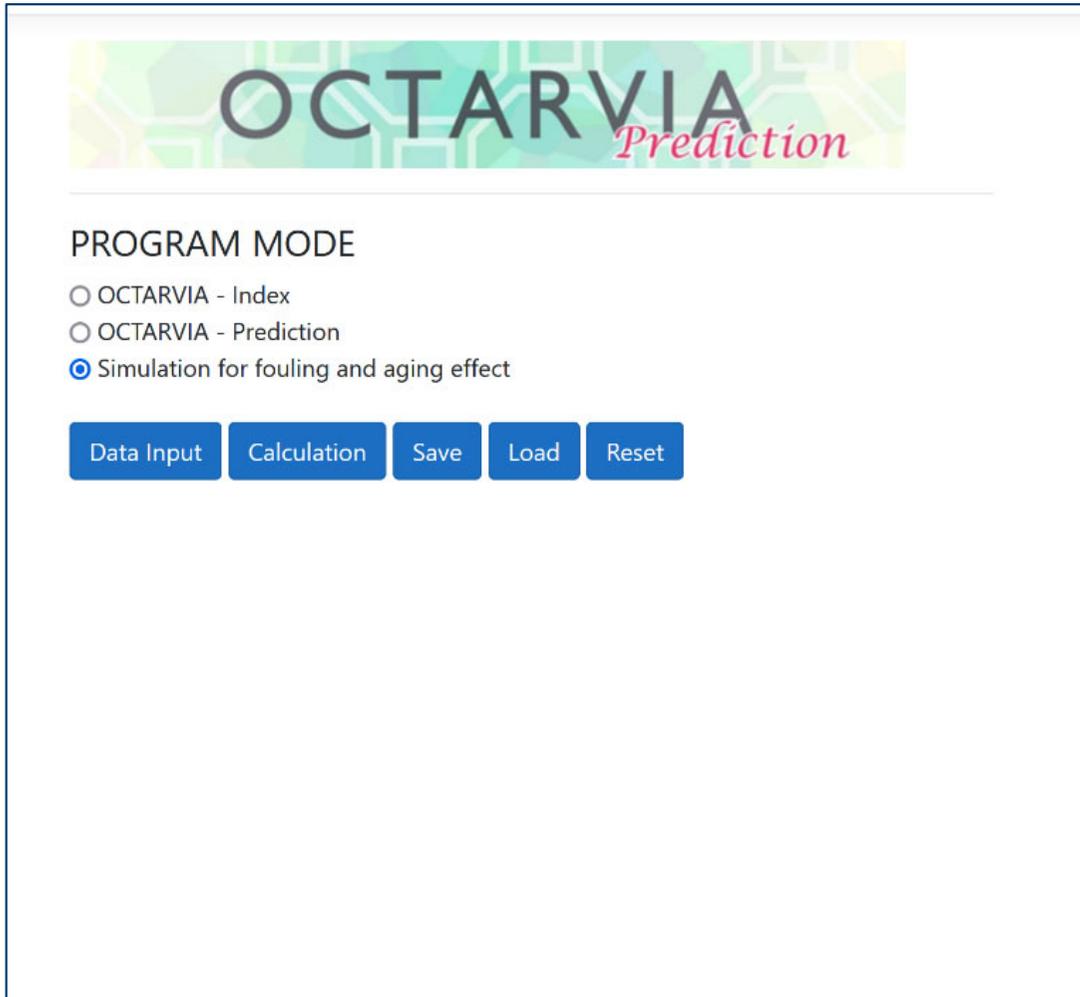
✓ 評価船速・評価年月日

Number of voyage data

Item	Value	Unit	Remarks
n_{vd}	4	-	Number of voyage for $i_{pir} = 1, 2$, number of date for $i_{pir} = 3$

k_{dep}	k_{arr}	V_{ss}
YYYY/MM/DD	YYYY/MM/DD	knot
2012 / 07 / 20	2012 / 08 / 18	24.8
2014 / 08 / 20	2014 / 09 / 18	24
2016 / 12 / 20	2017 / 10 / 18	24.8
2019 / 10 / 20	2019 / 11 / 18	23.6

計算



OCTARVIA
Prediction

PROGRAM MODE

OCTARVIA - Index

OCTARVIA - Prediction

Simulation for fouling and aging effect

Data Input Calculation Save Load Reset

■ Calculationボタン

- ✓ データ入力が済むとアクティブ

出力シート

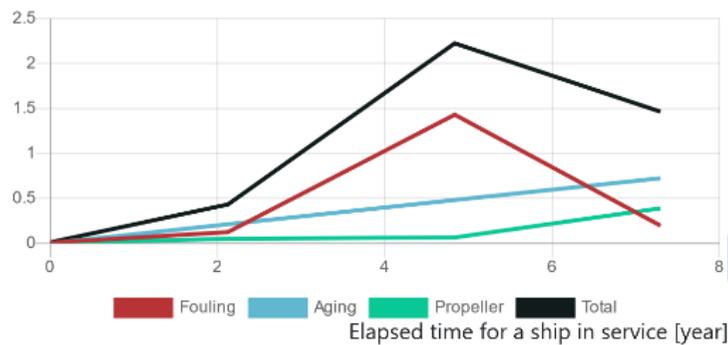
■ 出力シート

✓ 出力増加率の時系列

Export

t_1	t_2	rn_{sf}	rn_{sa}	rn_s	rn_p	ΔP
year	year	[%]	[%]	[%]	[%]	[%]
0	0	0	0	0	0	0
0.042	0.042	0.0085	0.0042	0.0127	0.0034	0.018
2.127	0.248	0.1245	0.2116	0.3362	0.0498	0.4321
4.838	0.427	1.4304	0.4814	1.9118	0.0647	2.2246
7.297	0.779	0.196	0.7237	0.9197	0.3892	1.4634

Rate in power increase [%]



Graph axis settings

Horizontal axis		Vertical axis	
Min	0	Min	0
Max	8	Max	2.5
Step	1	Step	0.5

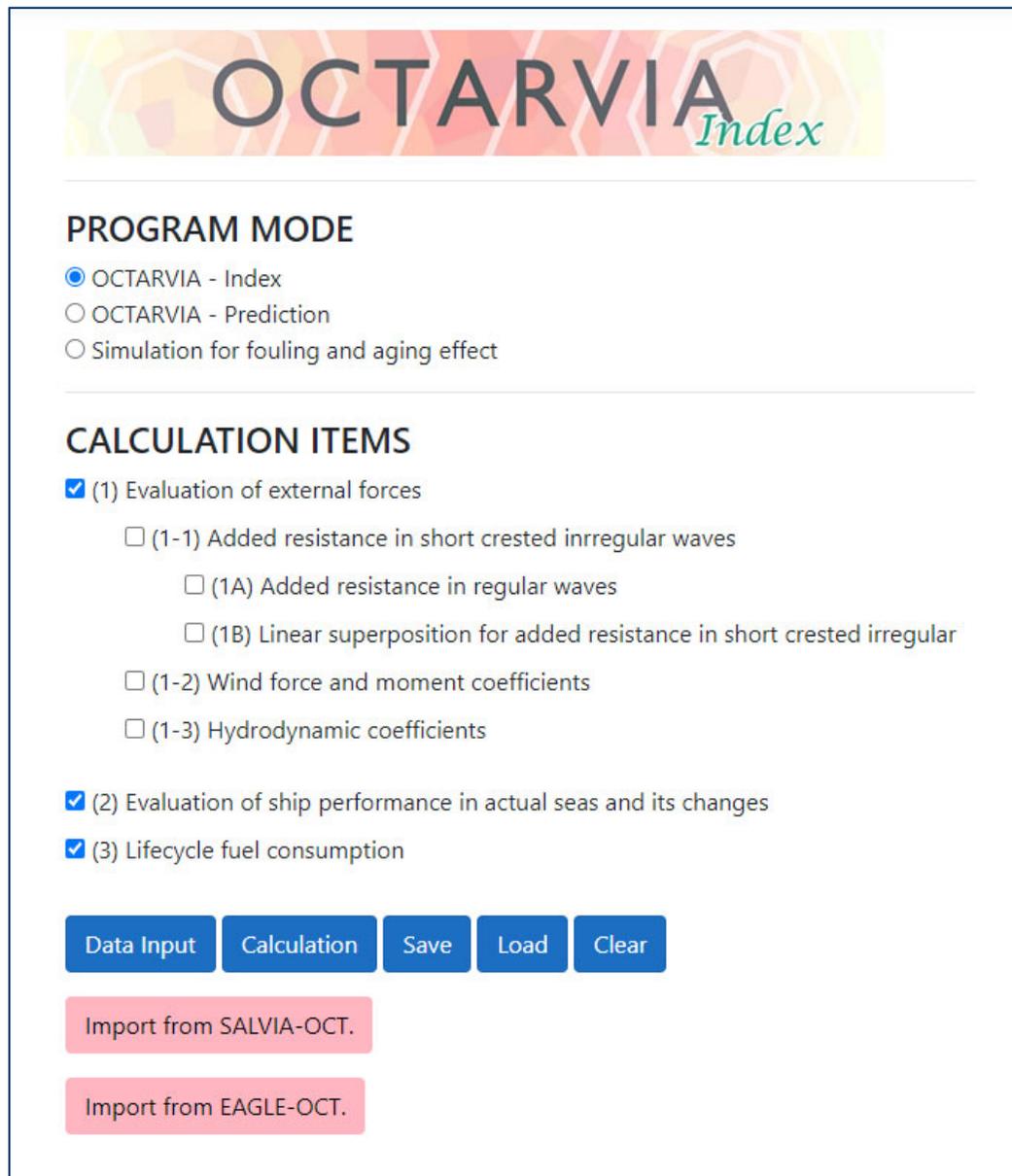
Adaptation

Simulation for fouling and aging effectモードの機能

- OCTARVIA-web（Simulation for fouling and aging effectモード）は、**経年劣化・生物汚損による主機出力増加率**を算定するプログラムです
- **ドックインのタイミング**による影響、クリーニングインターバルごとの**経年劣化・生物汚損による性能悪化率・回復率**の設定を考慮して、主機出力増加率の評価が可能です

保存・入出力機能

Save/Load, Import, Export機能



OCTARVIA
Index

PROGRAM MODE

OCTARVIA - Index
 OCTARVIA - Prediction
 Simulation for fouling and aging effect

CALCULATION ITEMS

(1) Evaluation of external forces

- (1-1) Added resistance in short crested irregular waves
 - (1A) Added resistance in regular waves
 - (1B) Linear superposition for added resistance in short crested irregular
- (1-2) Wind force and moment coefficients
- (1-3) Hydrodynamic coefficients

(2) Evaluation of ship performance in actual seas and its changes

(3) Lifecycle fuel consumption

Data Input **Calculation** **Save** **Load** **Clear**

Import from SALVIA-OCT.

Import from EAGLE-OCT.

■ Save/Load

- ✓ 入出力結果をZIPファイル形式で保存
- ✓ 計算前の入力のみでの状態でも可

■ Import

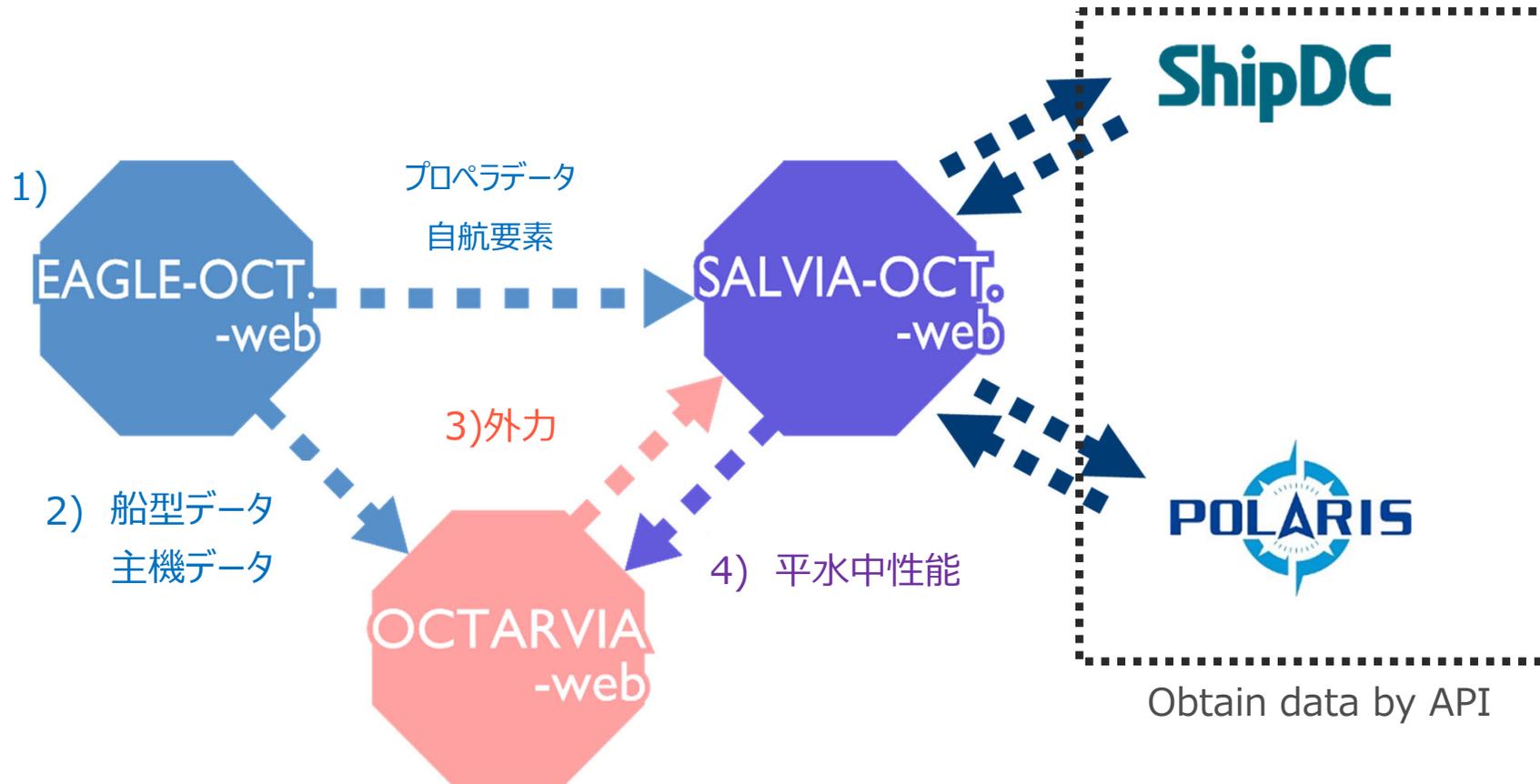
- ✓ EAGLE-OCT.による簡易推定結果が利用可能
 - 要目データ
 - 横断面形状パラメータ
 - 水線面形状
- ✓ SALVIA-OCT.による実船データ解析結果の利用が可能
 - 平水中抵抗
 - 平水中自航要素
 - プロペラ単独性能

■ Export

- ✓ 外力推定結果をSALVIA-OCT.の外乱修正で利用可能

他のアプリとの連携

他のアプリとの連携



アプリ間で連携することにより、以下が実行可能です。

- 1) EAGLE-OCT.-webで船体形状、船体・プロペラ性能を推定
- 2) 1)の結果を用い、OCTARVIA-webで、波、風による抵抗増加を計算
- 3) 1)及び2)の結果を用い、SALVIA-OCT.-webで、実船モニタリングデータ解析により平水中性能を評価
- 4) 1)~3)の結果を用い、OCTARVIA-webで任意海象での性能シミュレーション（船速、燃費）