

Our Work

Problem  
Analysis  
(I)

Data  
Preparation  
(II)

Model  
Construction  
(III)

Sensitivity  
Analysis  
(IV)

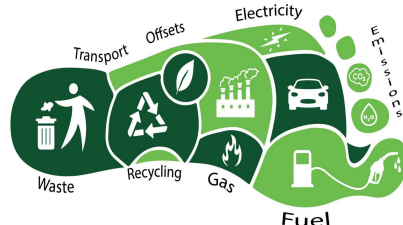
Model  
Extension  
(V)

Memorandum  
(VI)



Data collection for the cities of Juneau and Vancouver (II)

Economic Benefits  
Social Benefits  
Ecological Benefits



Consumption

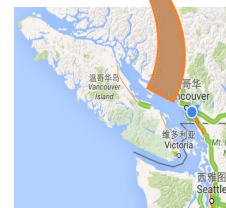


Resident

Carbon dioxide

Tourism spending	Jobs in tourism-dependent	Number of passengers
Vancouver Tourism spending 49.5B + hidden cost 4.0B Juneau Tourism spending 3.87B + hidden cost 0.91B	Vancouver employment contribution 1.6M Juneau employment contribution 0.2M	Vancouver Cruise passengers 0.15M + other passengers 4.0B Juneau Cruise passengers 1.67M 0.2M

Sea level



The Sustainable Multi-objective Tourism Optimizer (SMTO) (II)

$N_t$   $C_t$   $B_t$   $W_t$    
 $N_t$   $B_t$   $D_t$   $W_t$    
 $N_t$   $V_t$

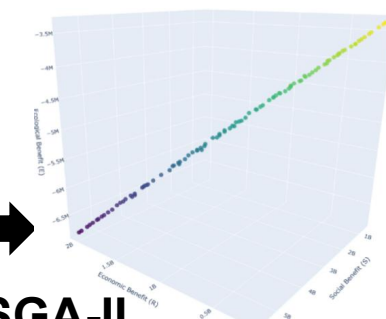
$$\begin{cases} R_t = N_t \times (C_t - B_t) + W_t \\ S_t = \alpha_1 N_t \times B_t + \alpha_2 D_t + \alpha_3 W_t \\ E_t = -\beta_1 N_t - \beta_2 V_t \end{cases}$$

SMTO

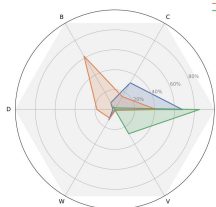
Constraint  
condition

Maximize  $R_t$   
Maximize  $S_t$   
Maximize  $E_t$

NSGA-II



Sobol sensitivity analysis



$$Y = f(X_1, X_2, \dots, X_K)$$

$$D = \sum_{i=1}^k D_i + \sum_{1 \leq i \leq k} D_{ij} + \dots + D_{1,2,\dots,k}$$

Sensitivity Analysis and Generalization (IV) (V)

NEW

$$S_{\text{new}, t} = \alpha_1 (N_t \cdot B_t) + \alpha_2^{\text{high}} D_t + \alpha_3 W_t \quad \text{weight of } D$$

$$E_{\text{new}, t} = \beta_1 N_t + \beta_3 V + \gamma \cdot \frac{\nabla V}{\nabla t}$$

the rate of sea level  
Update of the constraints

