formulation

INTEGER LINEAR PROGRAMMING

minimize $Z = Ax + By + Cz$

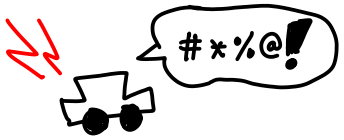
24 results

x : Budjet inconvenience
y : Travel inconvenience
z : Snow inconvenience
} compound variables

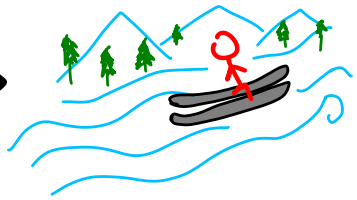
x ~ milage (MPG), people, distance
y ~ distance, road risk (?), snowfall rate, time, skill
z ~ snowfall rate, avg. snow, talk!

Calculate cost of trip, reduce by factor of people → $

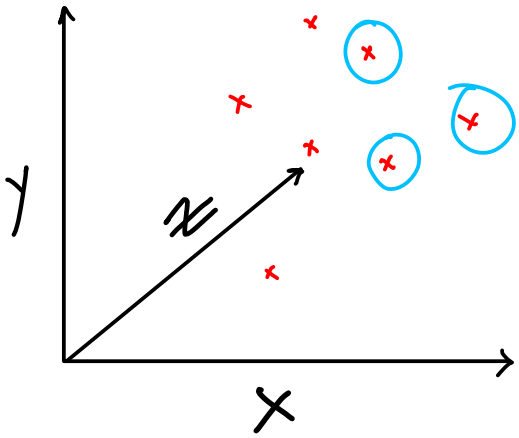
Calculate . . . (icy road data from COmip (polyline)), accidents, road closures, driving skills evaluation.
snow 1 hour.



what factors? (minimum snowfall (average), inches)
6 - 24"
24 hours < 6" good
How much snow would you like?



minimize current to avg



Higher is better!

Start location snowfall, 1 hour

end location snowfall, 1 hour, 24 hour.

$$X = \text{cost of. trip}$$

$$\frac{\left\{ \frac{1}{\text{miles/gal}} \times \text{fuel cost} \times \text{total miles} \right\}}{\text{people}}$$

(1/miles/gal: ↑ car; fuel cost: ↑ Colorado avg)

Y: snowfall last 1hr (start and end) →

traffic flow (normal − current) →

total time ( )

temperature (if < 5°F)

15/2/25

finalised ILP optimization objective function

minimize $Z = A_x + B_y + \{C_z\}^*$

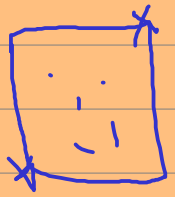
A ; user input Budjet constraint option (1-10)
B ; user input Time constraint option (1-10)
C ; user driving exp

$$X = \left\{ \frac{\frac{1}{\text{miles/gal}} \times \text{fuel cost} \times \text{total miles}}{\text{people}} \right\} \times \text{car maintanence factor}$$

(1/miles/gal: car; fuel cost: Colorado avg)

$$X = \left(\frac{\frac{1}{15} \times (\$3.1) \times \text{total miles}}{\text{people}} \right) \times 1.1$$

$y =$ snowfall last 24 h (start and end)
traffic flow : current time − normal time
people : 5 mins per person



$$y = m|Sf_s - Sf_e| + n|C_t - N_t| + q \times (\text{accidents}) + p \times (\#\text{people})$$

Q Example solved

Data from user :-

Nathan — Budget rank = 5/10

No. of people = 3 — Time rank = 7/10

Driving exp^n = Moderate

Data from API :-

$Sf_e = 5''$, $SF_s = 1''$ (Eldora)

Sf_e 6", $SF_s = 1''$ (A basin)

$N_t = 2340$, $C_t = 2700$ (E)

$N_t = 5640$, $C_t = 5700$ (A)

No. of reported accidents = 4 (E)

" = 10 (A)

total miles = 21.9 miles (Eldora)

70.9 miles (A-basin)

Solution

eldora ~5

$$X_e = \left(\frac{\frac{1}{15} \times 3.1 \times 21.9}{3} \right) \times 1.1 \quad , \quad X_e = 1.659$$ for 3

X

~10

$$X_a = \left(\frac{1/15 \times 3.1 \times 70.9}{3} \right) \times 1.1 \quad , \quad X_a = 5.372$$ for 3

Abasin

$$Ze_x = A \times x$$

$$= 5 \times 1.659 = 8.295$$

$$Za_x = 5 \times 5.372 = 26.863$$

1–10

Time

Y

10 , 5

$$y = m|Sf_s - Sf_e| + n|C_t - N_t| + q \times (\text{accidents}) + p \times (\#\text{people})$$

$$y_e = \underline{m}(4) + \underline{n}(360) + \underline{q} \times (4) + \underline{p}(3)$$

$$= 4 + \frac{360}{60} + 4 + 3$$

$$y_e = 4 + 6 + 4 + 3 = 17$$

Coded instead :)