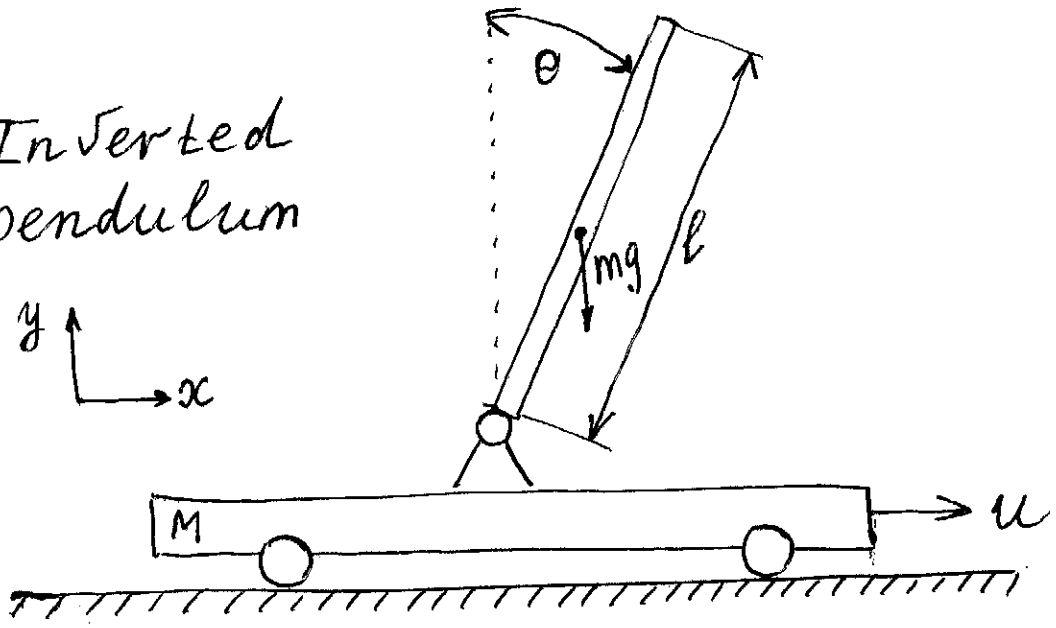
Control Problem

Inverted pendulum

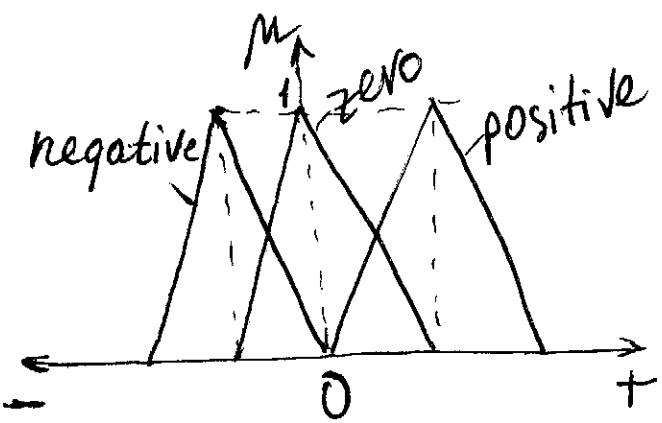


$$\ddot{\theta} = \frac{3g(M+m)}{4M+m}\theta + \frac{3u}{(4M+u)\ell}$$

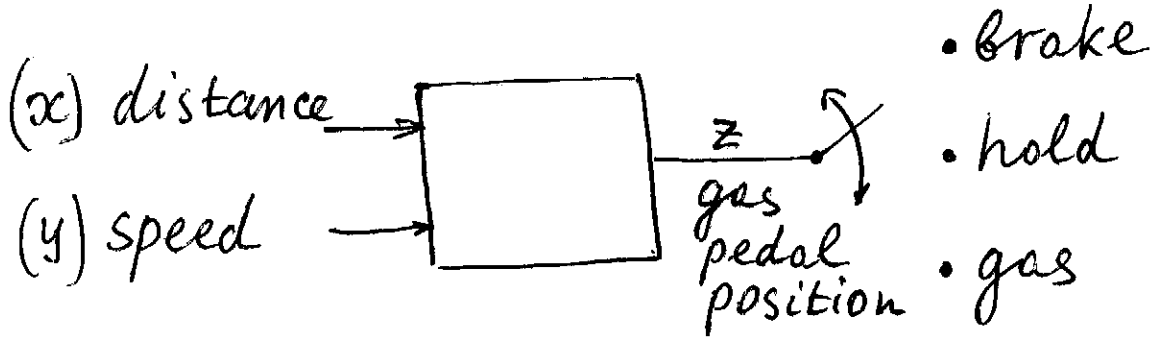
FUZZY IF - THEN RULES

$$\text{IF } \theta = \begin{Bmatrix}\text{negative}\\ \text{zero}\\ \text{positive}\end{Bmatrix} \text{ AND } \dot{\theta} = \begin{Bmatrix}\text{negative}\\ \text{zero}\\ \text{positive}\end{Bmatrix} \text{ THEN } u = \begin{Bmatrix}\text{negative}\\ \text{zero}\\ \text{positive}\end{Bmatrix}$$

θ \ $\dot{\theta}$	N	Z	P
N	N	N	P
Z	N	Z	P
P	Z	P	P

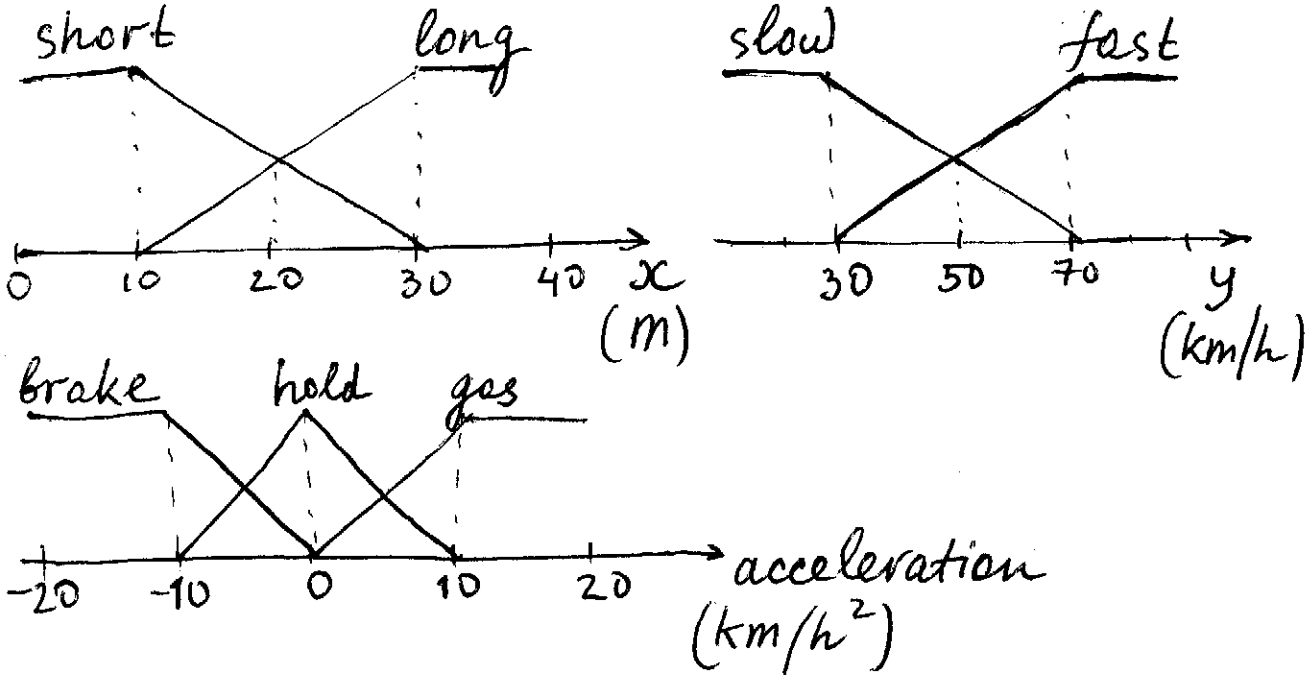


Automobile Driving

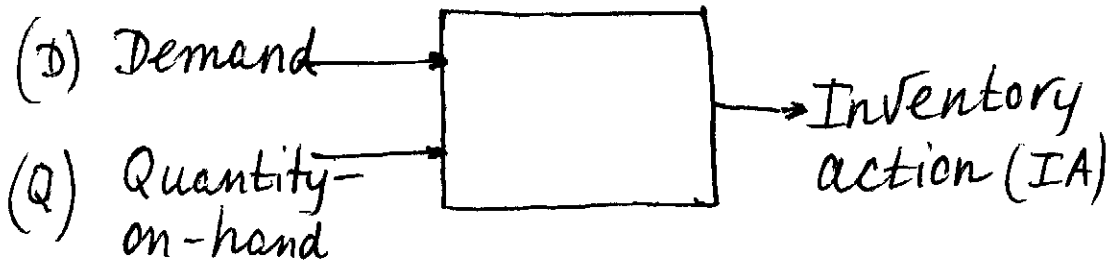


IF		THEN
distance (x)	speed (y)	pedal position (z)
short	slow	maintain speed (hold)
short	fast	reduce speed (brake)
long	slow	increase speed (gas)
long	fast	maintain speed (hold)

MEMBERSHIP FUNCTIONS



INVENTORY CONTROL



Demand = { F = falling; D = decreased; S = steady; I = increased; R = rising }

Quantity-on-hand (Q) = { minimal (M); low (L); Adequate (A); high (H); Excessive (E) }

Inventory action = { negative large (NL); negative moderate (NM); negative small (NS); Zero (O); positive small (PS); positive moderate (PL); positive large }

D \ Q	M	L	A	H	E
F	O	O	NS	NM	NL
D	PS	O	NS	NM	NM
S	PM	PS	O	NS	NM
I	PM	PM	PS	O	O
R	PL	PL	PM	PS	O

CONCLUSIONS

1. Corsons law:

„It's better to be rich and healthy than poor and sick"

2. Difference between literature and science