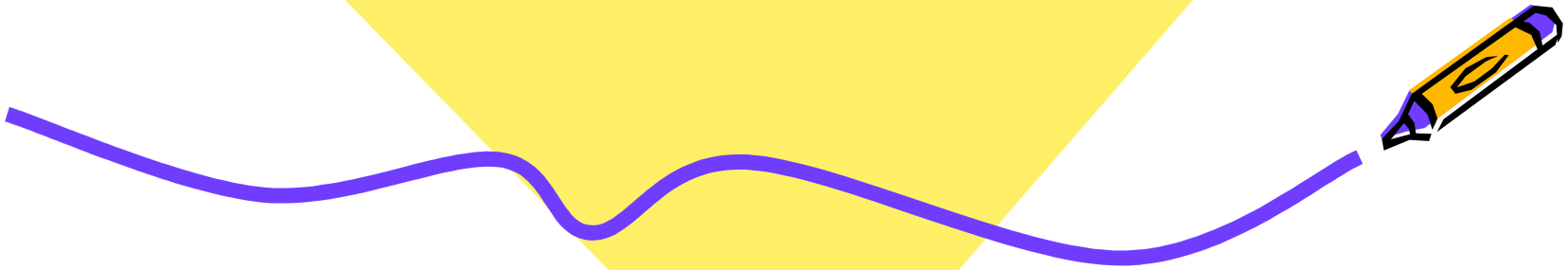
CURBE DE FORMA LIBERA

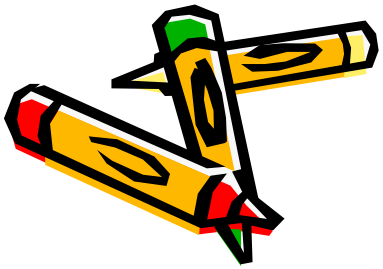


Cum sunt definite?

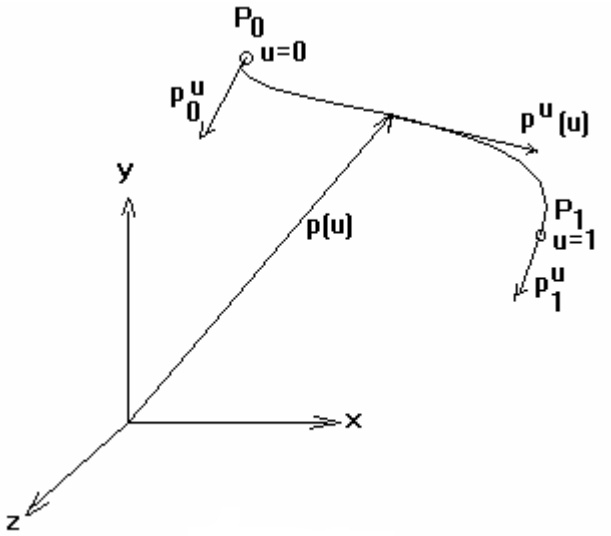
- Prin puncte din plan (curbe 2D) sau din spatiu (curbe 3D)
- In unele cazuri se mai dau tangente in punctele respective

2 tipuri de curbe:

- De interpolare: trec prin toate punctele date
- De aproximare: punctele date controleaza forma curbei



Modelarea matematica



Reprezentarea parametrica:

x(u) = fx(u);
y(u) = fy(u); umin<= u <= umax
z(u) = fz(u);

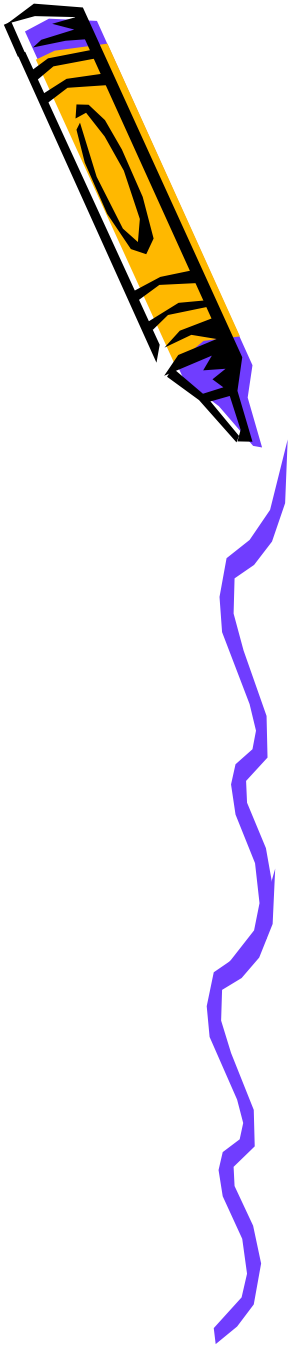
fx, fy, fz : functii polinomiale

p(u) = [x(u), y(u), z(u)] forma vectoriala

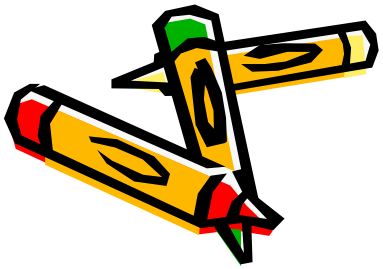
Exemple:

Avantajele reprezentarii parametrice:

Prin ce se deosebesc diferitele tipuri de curbe de forma libera?



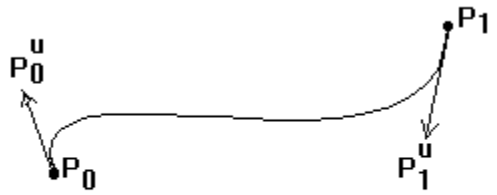
Prin conditiile geometrice pe care le satisfac si prin care sunt definite



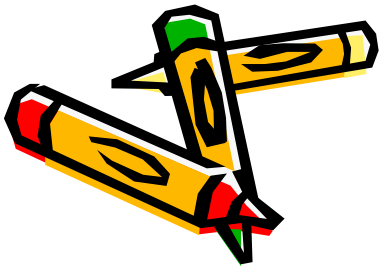
•Curbe Hermite (Coons)

•Conditiile geometrice:

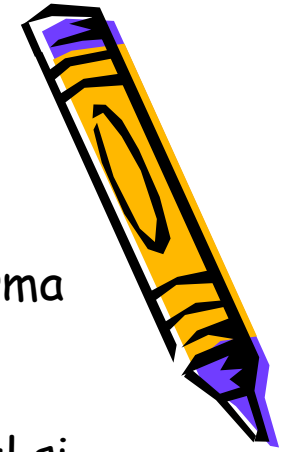
punctele extreme si tangentele in punctele extreme



Curba Coons



•Curbe Bezier

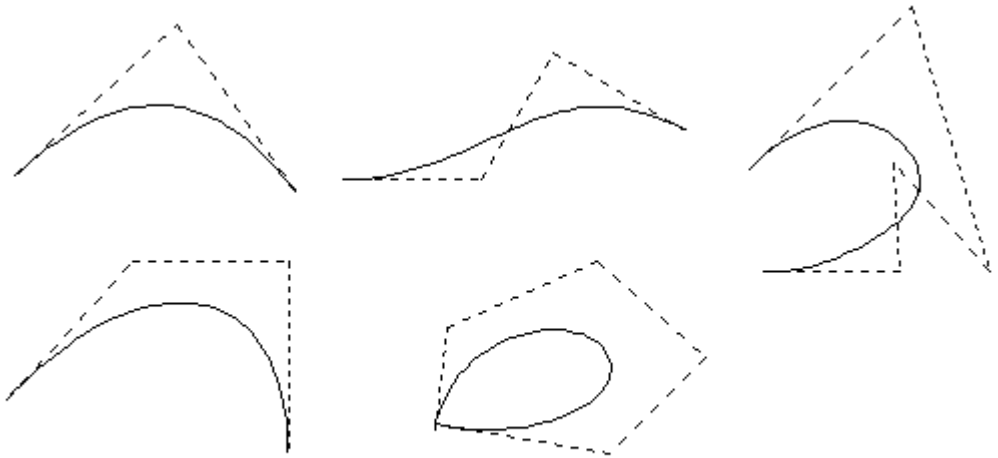


• **Conditiile geometrice**: o secventa de puncte care determina forma si pozitia curbei

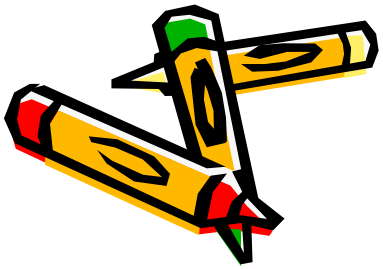
•Curba trece prin primul si ultimul punct si este tangenta in primul si ultimul punct

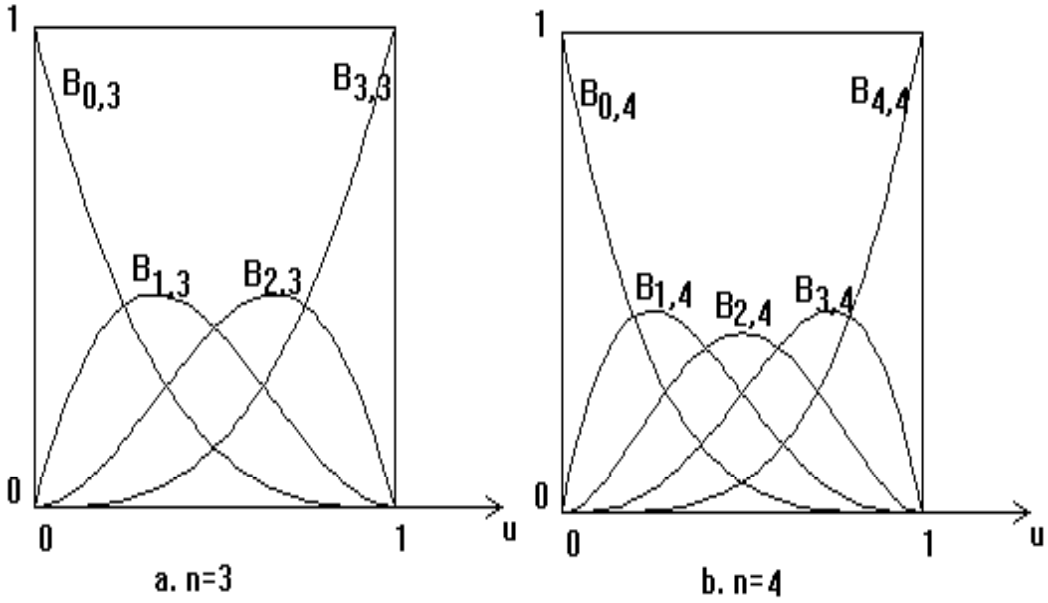
•Gradul polinomului care modeleaza matematic curba depinde de numarul de puncte de control

•Forma curbei depi



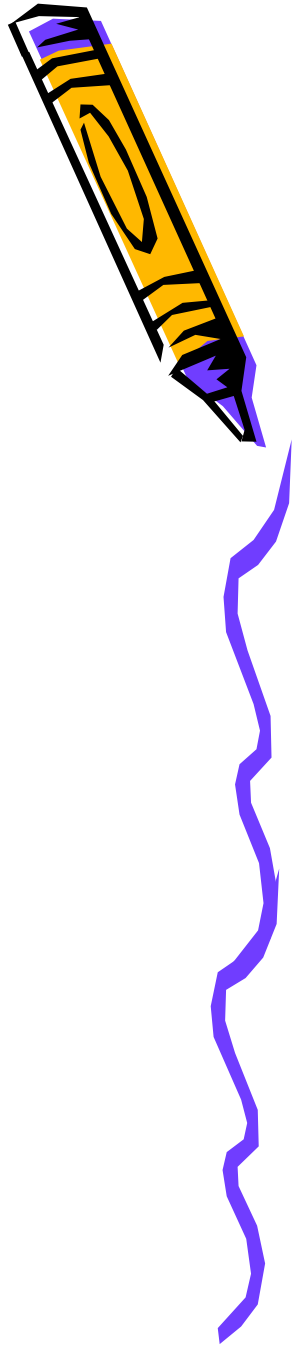
Curbe Bezier



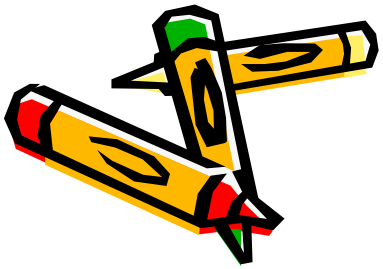


Functiile de amestec pentru curbele Bezier
date prin n+1 puncte de control

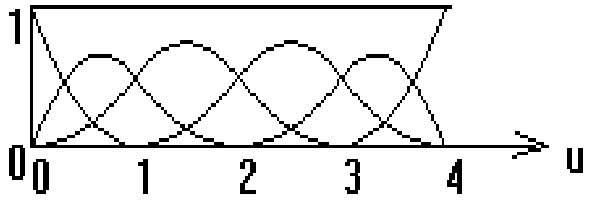
•Curbe B-spline



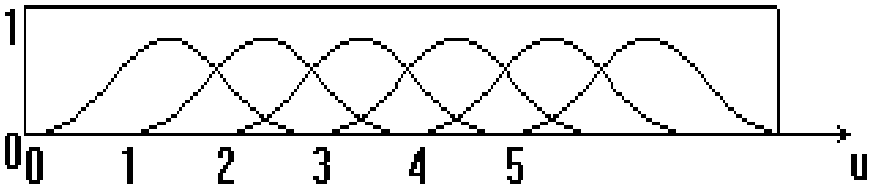
- **Conditiile geometrice**: o secventa de puncte care determina forma si pozitia curbei
- Gradul polinomului care modeleaza matematic curba **nu** depinde de numarul de puncte de control



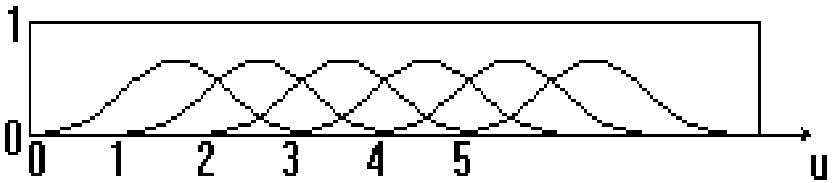
Functiile de amestec pentru curbele B-spline



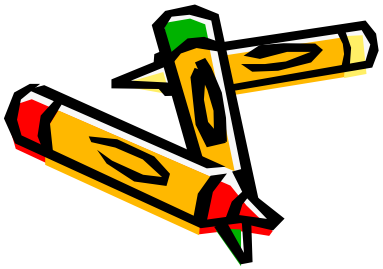
Functii B-spline uniforme de grad 2 , neperiodice

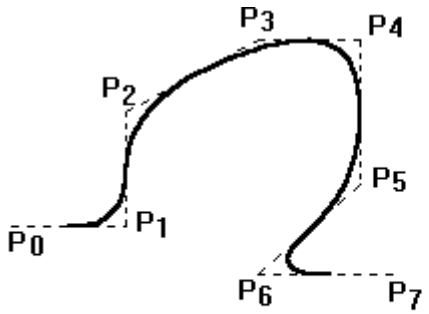


Functiile B-spline uniforme periodice de grad 2 (n=5)

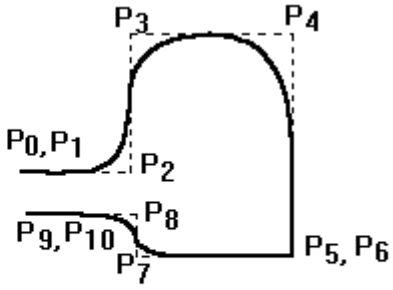


Functiile B-spline uniforme periodice de grad 3

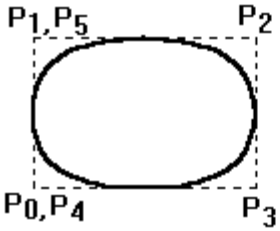




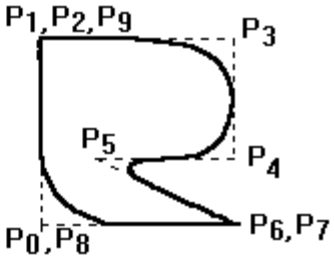
6.13. a.



6.13. b.

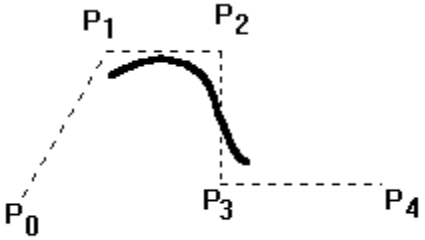


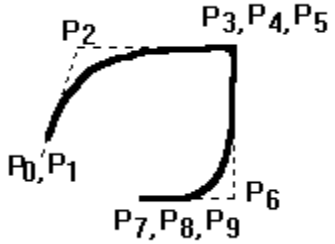
6.13. c.

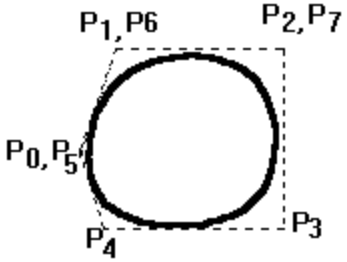


6.13. d.

Curbe B-spline uniforme periodice de grad 2.





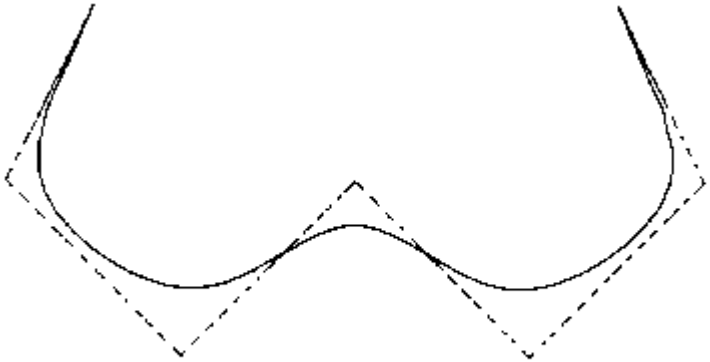


Curbe B-spline uniforme periodice de grad 3

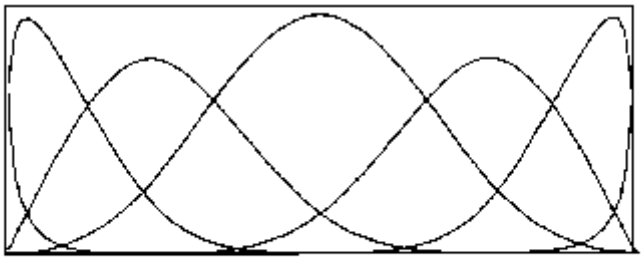
•Curbe Nurbs: curbe B-spline generalizate

•Conditiile geometrice: secventa de puncte care determina forma si pozitia curbei.

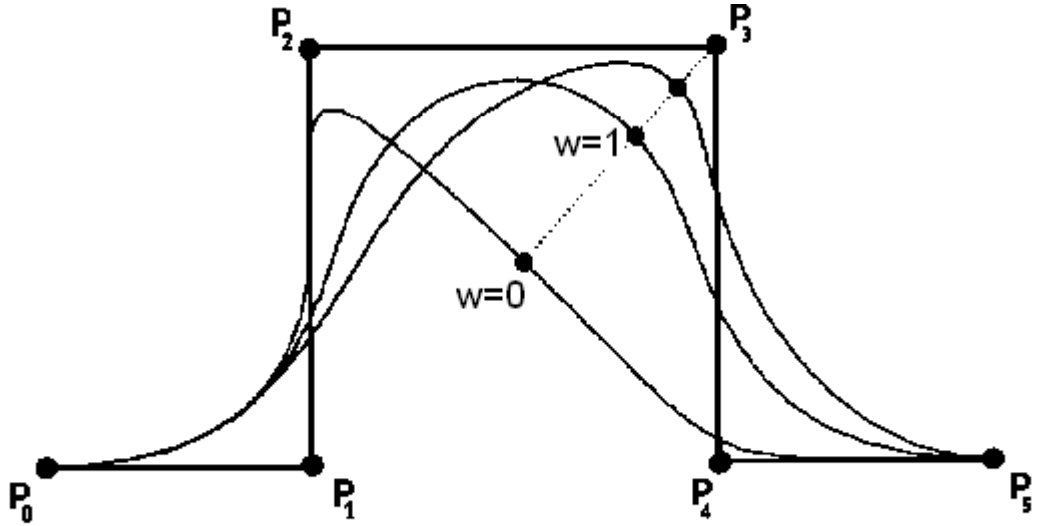
•Forma curbei poate fi controlata si prin ponderile asociate punctelor de control.



Curba NURBS definita prin 7 puncte de control



Functiile de amestec pentru curbele NURBS



Influenta ponderilor asociate varfurilor asupra formei curbei