

Prediction

Consider the last 3 points (A,B,C) on a smooth curve. How can we predict the next point D?

Here we look at three second order predictors.

When $AB=BC$, all predictors produce the same result:

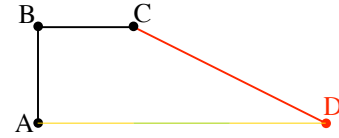
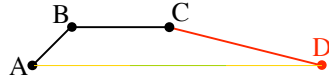
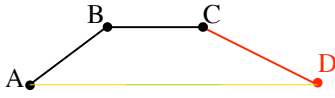


TB: Taylor from B (parabolic trajectory)

F is a quadratic point-valued function. $F(0)=B$, $F'(0)=AC/2$, $F''(0)=BC-AB$

$D=F(2)=F(0)+2F'(0)+2^2F''(0)/2=B+2(AC/2)+2(BC-AB)$, $BD=AC+2BC+2BA$, $AD=AC+2BC+2BA+AB$, $AD=2BC+BA+AC=2BC$

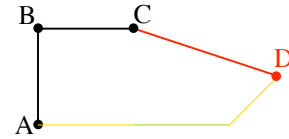
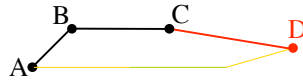
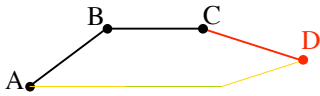
Or more simply: $BC-AB=CD-BC$, $CD=2BC+BA$, $AD=3BC$



TC: Taylor from C

F is a quadratic point-valued function. $F(0)=C$, $F'(0)=BC$, $F''(0)=BC-AB$

$D=F(1)=F(0)+F'(0)+F''(0)/2=C+BC+(BC-AB)/2$, $CD=BC+(BC+BA)/2$, $AD=AC+BC+BC/2+BA/2+BC/2+CB/2$, $AD=2BC+AC/2$



Replica

Triangles BCD is obtained by scaling triangle ABC by $\|BC\|/\|AB\|$ and by rotating it so that the edges BC coincide.

