CASE 1: START GRADIENT = END GRADIENT

SPLINES WILL BE SYMMETRIC

$t = 0.5$

$d = 2b$

CASE 2: $a < b < c$ or $a > b > c$

LET $d = b$ (spline gradient = segment gradient)

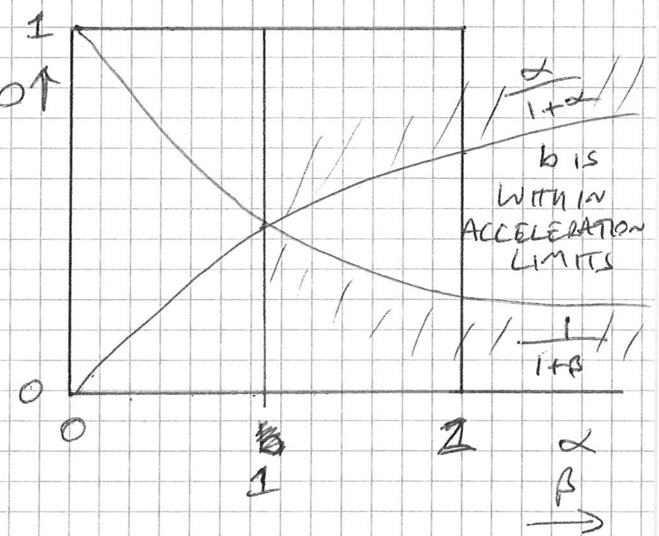
$\therefore \quad t = b - 2b + 1 = 1 - b$

As $b \to a$ or $b \to c$, the acceleration rises.

$\alpha = \frac{d}{t} = \frac{b}{1-b}$ $\qquad \beta = \frac{1-d}{1-t} = \frac{1-b}{b}$

$\therefore \quad b = \frac{\alpha}{1+\alpha}$

$\therefore \quad b = \frac{1}{1+\beta}$



IF ACCELERATION IS LIMITED TO M
normalised acceleration limit

$$m = \left| \frac{M \cdot T}{C - A} \right|$$

CONDITION FOR CASE 2:

$$\frac{m}{1+m} > b > \frac{1}{1+m}$$

CASE 3

IF LIMIT ON ACCELERATION: $b < \frac{1}{1+m}$ or $b > \frac{m}{1+m}$

IF NO LIMIT: $b \leq \emptyset$ or $b \geq 1$

PARABOLAS WITH HAVE OPPOSITE CURVATURE.

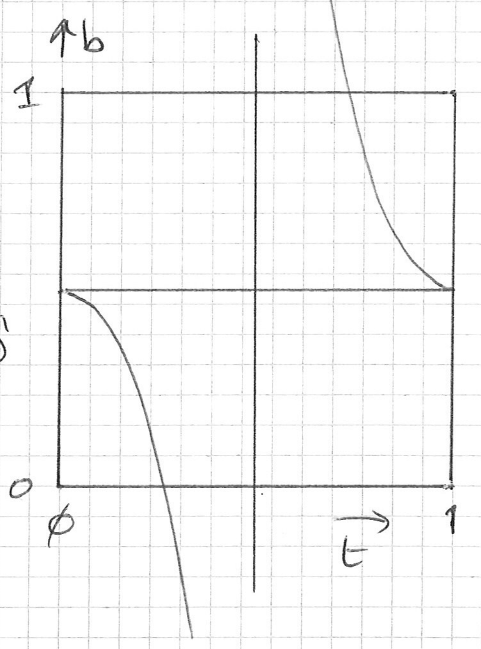
TO MINIMUM ACCELERATION, $\alpha = -\beta$.

$$\therefore \quad \frac{d}{t} = \frac{-(1-d)}{1-t}$$

$$\therefore \quad d = \frac{t}{2t-1}$$

AND $\quad d = t + 2b - 1$

$$t = 1 - b \pm \sqrt{\tfrac{1}{2} + b(b-1)}$$



For $b = 0.5 \qquad t = 0.5$

$b < 0.5 \qquad t = 1 - b - \sqrt{\tfrac{1}{2} + b(b-1)}$

$b > 0.5 \qquad t = 1 - b + \sqrt{\tfrac{1}{2} + b(b-1)}$