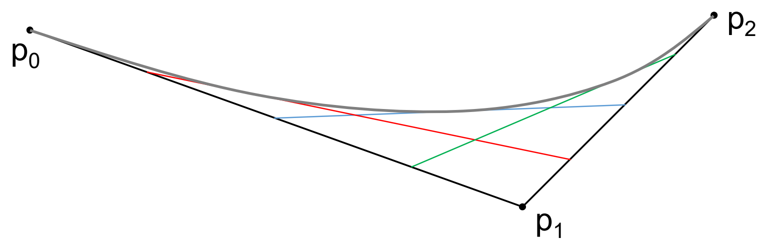
1. **2nd order (quadratic) Bézier curve:** Draw the Bézier curve with control points p_0,p_1,p_2, using guiding points with t = 0.25,0.5,0.75.



2. Here is the parametric equation of a quadratic Bézier curve

$$Q(t) = (1 - t)^2 p_0 + 2(1 - t)t\, p_1 + t^2 p_2$$

(a) Rearrange this function to make it look more like a quadratic in t (i.e. $Q(t) = at^2 + bt + c$).
$Q(t) = p_0 - 2\,t\,p_0 + t^2 p_0 + 2\,t\,p_1 - 2t^2 p_1 + t^2 p_2$
$Q(t) = t^2 p_0 - 2t^2 p_1 + t^2 p_2 - 2\,t\,p_0 + 2\,t\,p_1 + p_0$
$Q(t) = (p_0 - 2p_1 + p_2)\,t^2 + (2\,p_1 - 2\,p_0)\,t + p_0$

(b) Take the derivative of this rearranged function with respect to t.

$$\frac{dQ}{dt} = 2(p_0 - 2p_1 + p_2)t + 2(p_1 - p_0)$$

(c) What is the derivative at $t = 0$? $t = 1$? What can we say about the tangents at p_0 and p_2?
At $t = 0$, $\frac{dQ}{dt} = 2(p_1 - p_0)$, *in other words it points from* p_0 *towards* p_1.
At $t = 1$, $\frac{dQ}{dt} = 2(p_0 - 2p_1 + p_2) + 2(p_1 - p_0) = 2(p_2 - p_1)$, *so it points from* p_1 *towards* p_2.

3. **3rd order (cubic) Bézier curve:** Draw the Bézier curve with control points p_0,p_1,p_2,p_3, using guiding points with t = 0.25,0.5,0.75.