mas110: recitation 1: paths

paths can be used as actual strokes, guides for animations, or values for other attributes (e.g. color)

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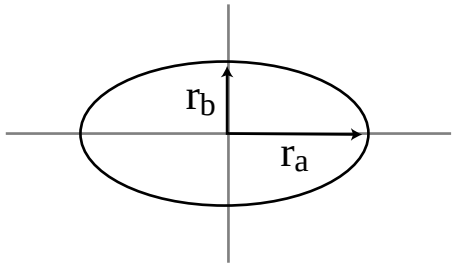
ovals

N = number of points*

angle = $2\pi\, n / N$

$x_n = r_a \cos(\text{ angle })$

$y_n = r_b \sin(\text{ angle})$



*can be used for all regular polygons (triangles, diamongs, pentagons, etc.)

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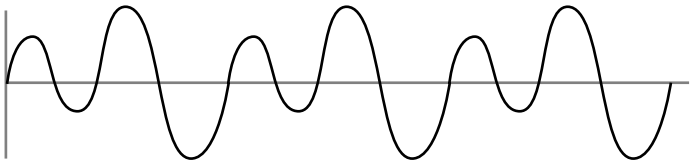
periodic

$y = \sum \alpha \sin(\beta x+\gamma)$



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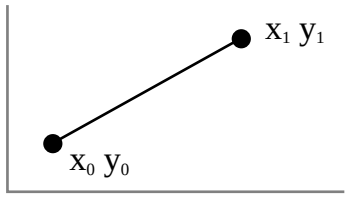
linear parameterized

$a_x = x_1 - x_0 \qquad a_y = y_1 - y_0$

$b_x = x_0 \qquad b_y = y_0$

$x_t = a_x t + b_x \qquad y_t = a_y t + b_y \qquad (t=0\ldots1)$



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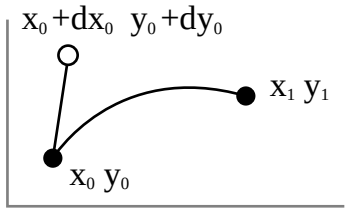
quadratic parameterized

$a_x = x_1 - x_0 - dx_0 \qquad a_y = y_1 - y_0 - dy_0$

$b_x = dx_0 \qquad b_y = dy_0$

$c_x = x_0 \qquad c_y = y_0$

$x_t = a_x t^2 + b_x t + c_x \qquad y_t = a_y t^2 + b_y t + c_y \qquad (t=0\ldots1)$



note: dx_0 and dy_0 should be scaled for greater curvature

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cubic parameterized (bezier)

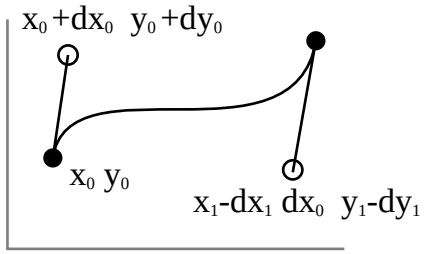
$a_x = 2x_0 - 2x_1 + dx_0 + dx_1$

$b_x = -3x_0 + 3x_1 - 2dx_0 - dx_1$

$c_x = dx_0$

$d_x = x_0$

$x_t = a_x t^3 + b_x t^2 + c_x t + d_x \qquad (t=0\ldots1)$



note: dx_0, dy_0, dx_1 and dy_1 should be scaled for greater curvature