E2: (v0x + x01 (v1x - v0x) + y01 (v1y - v0y) - v2x')^2 + (v0y + x01 (v1y - v0y) + y01 (v0x - v1x) - v2y')^2
Derivative with respect to v0x:
2 (v1y y01 + v0x (1 - 2 x01 + x01^2 + y01^2) - v1x (-x01 + x01^2 + y01^2) - v2x' + x01 v2x' - y01 v2y')
Derivative with respect to v0y:
2 (-v1x y01 + v0y (1 - 2 x01 + x01^2 + y01^2) - v1y (-x01 + x01^2 + y01^2) + y01 v2x' - v2y' + x01 v2y')
Derivative with respect to v1x:
-2 (v0y y01 - v1x (x01^2 + y01^2) + v0x (-x01 + x01^2 + y01^2) + x01 v2x' - y01 v2y')
Derivative with respect to v1y:
2 (v0x y01 + v1y (x01^2 + y01^2) - v0y (-x01 + x01^2 + y01^2) - y01 v2x' - x01 v2y')

E1: ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) + x20 (v0x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) + y20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) - v1x')^2 + ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) + x20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) + y20 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v0x) - v1y')^2
Derivative with respect to v0x:
2 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) + x20 (v0x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) + y20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) - v1x') (1 + x01 (-1 + x20) - y01 y20) + 2 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) + x20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) + y20 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v0x) - v1y') (y01 - y01 x20 - x01 y20)
Derivative with respect to v0y:
2 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) + x20 (v0x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) + y20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) - v1x') (y01 (-1 + x20) + x01 y20) + 2 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) + x20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) + y20 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v0x) - v1y') (1 + x01 (-1 + x20) - y01 y20)
Derivative with respect to v1x:
2 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) + x20 (v0x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) + y20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) - v1x') (x01 - x01 x20 + y01 y20) + 2 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) + x20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) + y20 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v0x) - v1y') (y01 (-1 + x20) + x01 y20)
Derivative with respect to v1y:
2 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) + x20 (v0x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) + y20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) - v1x') (y01 - y01 x20 - x01 y20) + 2 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) + x20 (v0y - (v0y + x01 (v1y - v0y) + y01 (v0x - v1x))) + y20 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v0x) - v1y') (x01 - x01 x20 + y01 y20)

E0: (v1x + x12 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v1x) + y12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) - v0x')^2 + (v1y + x12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) + y12 (v1x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) - v0y')^2
Derivative with respect to v0x:
2 (v1x + x12 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v1x) + y12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) - v0x') (x12 - x01 x12 + y01 y12) + 2 (v1y + x12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) + y12 (v1x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) - v0y') (y01 x12 + (-1 + x01) y12)
Derivative with respect to v0y:
2 (v1x + x12 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v1x) + y12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) - v0x') (-(y01 x12) + y12 - x01 y12) + 2 (v1y + x12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) + y12 (v1x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) - v0y') (x12 - x01 x12 + y01 y12)
Derivative with respect to v1x:
2 (v1x + x12 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v1x) + y12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) - v0x') (1 + (-1 + x01) x12 - y01 y12) + 2 (v1y + x12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) + y12 (v1x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) - v0y') (-(y01 x12) + y12 - x01 y12)
Derivative with respect to v1y:
2 (v1x + x12 ((v0x + x01 (v1x - v0x) + y01 (v1y - v0y)) - v1x) + y12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) - v0x') (y01 x12 + (-1 + x01) y12) + 2 (v1y + x12 ((v0y + x01 (v1y - v0y) + y01 (v0x - v1x)) - v1y) + y12 (v1x - (v0x + x01 (v1x - v0x) + y01 (v1y - v0y))) - v0y') (1 + (-1 + x01) x12 - y01 y12)