

Equation A:  $x_2(t_0) - x_1(t_0) = lane - width$

Equation B:  $y_1(t_e) - y_2(t_e) = L_d + vehicle\_length$

Equation C:  $v_y(t) = v_y(t_0) + \int_{t_0}^t a_y(u) du$

Equation D:

$y(t) = y(t_0) + \int_{t_0}^t v_y(u) du = y(t_0) + v_y(t_0) \times (t - t_0) + \int_{t_0}^t \int_{t_0}^w a_y(u) dudw$

Equation E:

$y_1(t_e) - y_2(t_e) = y_1(t_0) + v_{y,1}(t_0)(t_e - t_0) + \int_{t_0}^{t_e} \int_{t_0}^w a_{y,1}(u) dudw - y_2(t_0) - v_{y,2}(t_e - t_0) + \int_{t_0}^{t_e} \int_{t_0}^w a_{y,2}(u) dudw = \int_{t_0}^{t_e} \int_{t_0}^w (a_{y,1}(u) - a_{y,2}(u)) dudw = D_{vehicle\_type}$