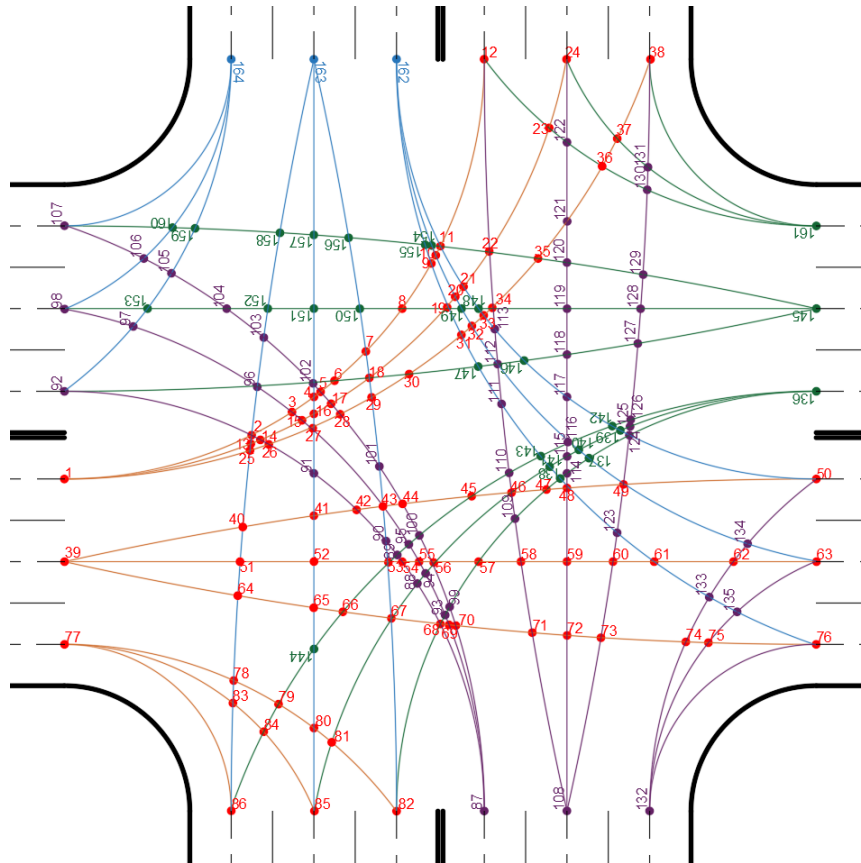


APPENDIX

APPENDIX A.1 POTENTIAL CONFLICT POINTS IN AN INTERSECTION



Name	Expression	d (intermediate variable)
$d(1,2)$	$r_6 \arccos\left(\frac{L+2b}{2r_6}\right)$	-
$d(1,3)$	$r_6 \left[\arccos\left(\frac{d^2 - r_5^2 + r_6^2}{2dr_6}\right) - \arccos\left(\frac{L+2b}{d}\right) \right]$	$\sqrt{(L+2b)^2 + (r_5 - L - b + 5a)^2}$
$d(1,4)$	$r_6 \sin^{-1}\left(\frac{b+3a}{r_6}\right)$	-
$d(1,5)$	$r_6 \left[\arccos\left(\frac{d^2 - r_4^2 + r_6^2}{2dr_6}\right) - \arccos\left(\frac{L+2b}{d}\right) \right]$	$\sqrt{(L+2b)^2 + (r_4 - L - b + 5a)^2}$
$d(1,6)$	$r_6 \arccos\left(\frac{r_7^2 - r_6^2 - d^2}{2dr_6}\right)$	$r_7 - 5a - b$
$d(1,7)$	$r_6 \left[\pi - \arccos\left(\frac{r_7^2 - r_6^2 - d^2}{2dr_6}\right) - \arccos\left(\frac{L+2b}{d}\right) \right]$	$\sqrt{(L+2b)^2 + (R_7 - 5a - b)^2}$
$d(1,8)$	$r_6 \arccos\left(\frac{b+3a}{r_6}\right)$	-
$d(1,9)$	$r_6 \sin^{-1}\left(\frac{d^2 - r_4^2 + r_6^2}{2dr_6}\right)$	$r_4 + b + 5a$
$d(1,10)$	$r_6 \sin^{-1}\left(\frac{r_5^2 - r_6^2 - d^2}{2dr_6}\right)$	$r_5 + b + 5a$
$d(1,11)$	$r_6 \sin^{-1}\left(\frac{d}{r_6}\right)$	$L + 2b$
$d(1,12)$	$\frac{\pi r_6}{2}$	-
$d(1,13)$	$r_5 \left[\arccos\left(\frac{r_5 + 5a + b}{d}\right) - \arccos\left(\frac{d^2 - r_7^2 + r_5^2}{2dr_5}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_7 + a + b)^2}$
$d(1,13)$	$r_5 \left[\arccos\left(\frac{r_5 + 5a + b}{d}\right) - \arccos\left(\frac{d^2 - r_7^2 + r_5^2}{2dr_5}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_7 + a + b)^2}$
$d(1,14)$	$r_5 \arccos\left(\frac{d^2 - r_6^2 + r_5^2}{2dr_5}\right)$	$r_5 + 5a + b$
$d(1,15)$	$r_5 \left[\arccos\left(\frac{d}{r_5}\right) - \arccos\left(\frac{r_5 + 5a + b}{d}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_5 - L + 5a - b)^2}$
$d(1,16)$	$r_5 \arcsin\left(\frac{b+3a}{r_5}\right)$	-
$d(1,17)$	$r_5 \left[\arccos\left(\frac{d^2 - r_4^2 + r_5^2}{2dr_5}\right) - \arccos\left(\frac{r_5 + 5a + b}{d}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_4 - L - b + 5a)^2}$
$d(1,18)$	$r_5 \left[\pi - \arccos\left(\frac{r_7^2 - r_5^2 - d^2}{2dr_5}\right) - \arctan\left(\frac{r_7 - 5a - b}{r_5 + 5a + b}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_7 - 5a - b)^2}$
$d(1,19)$	$r_5 \arccos\left(\frac{r_5 - b - 4a}{r_5}\right)$	-
$d(1,20)$	$r_5 \left[\arccos\left(\frac{r_5 - L + 5a - b}{d}\right) - \arccos\left(\frac{d}{2r_5}\right) \right]$	$\sqrt{(r_5 - L + 5a - b)^2 + (r_5 + 5a + b)^2}$
$d(1,21)$	$r_5 \left[\arccos\left(\frac{r_5 - L + 5a - b}{d}\right) - \arccos\left(\frac{d^2 - r_6^2 + r_5^2}{2d^2}\right) \right]$	$\sqrt{(r_5 - L + 5a - b)^2 + (r_6 + 5a + b)^2}$
$d(1,21)$	$r_5 \arccos\left(\frac{d^2 - r_7^2 + r_5^2}{2dr_5}\right)$	$r_5 - L + 6a + r_7$
$d(1,23)$	$r_5 \left[\frac{\pi}{2} - \arccos\left(\frac{d^2 - r_3^2 + r_5^2}{2dr_5}\right) + \arctan\left(\frac{r_3 - 6a - r_5 + L}{L + 2b}\right) \right]$	$\sqrt{(L+2b)^2 + (r_3 - r_5 + L - 6a)^2}$
$d(1,24)$	$r_5 \arccos\left(\frac{r_5 - L + 5a - b}{r_5}\right)$	-
$d(1,25)$	$r_4 \left[\arccos\left(\frac{r_4 + 5a + b}{d}\right) - \arccos\left(\frac{d^2 - r_7^2 + r_4^2}{2dr_5}\right) \right] *$	$\sqrt{(r_4 + 5a + b)^2 + (r_7 + a + b)^2}$
$d(1,26)$	$r_4 \arccos\left(\frac{d^2 - r_6^2 + r_4^2}{2dr_5}\right)$	$r_4 + 5a + b$
$d(1,27)$	$r_4 \left[\arccos\left(\frac{d^2 - r_5^2 + r_4^2}{2dr_5}\right) - \arccos\left(\frac{r_4 + 5a + b}{d}\right) \right]$	$\sqrt{(r_4 + 5a + b)^2 + (r_5 - L - b + 5a)^2}$
$d(1,28)$	$r_4 \left[\arccos\left(\frac{d}{r_5}\right) - \arccos\left(\frac{r_4 + 5a + b}{d}\right) \right]$	$\sqrt{(r_4 + 5a + b)^2 + (r_4 - L - b + 5a)^2}$
$d(1,29)$	$r_4 \left[\pi - \arccos\left(\frac{r_7^2 - r_4^2 - d^2}{2dr_4}\right) - \arctan\left(\frac{r_7 - 5a - b}{r_4 + 5a + b}\right) \right]$	$\sqrt{(r_4 + 5a + b)^2 + (r_7 - 5a - b)^2}$
$d(1,30)$	$r_4 \arccos\left(\frac{r_7^2 - r_4^2 - d^2}{2dr_4}\right)$	$(r_7 - 5a - b) - (r_4 - L + 5a - b)$
$d(1,31)$	$r_4 \left[\arccos\left(\frac{r_4 - L + 5a - b}{d}\right) - \arccos\left(\frac{d}{2r_4}\right) \right]$	$\sqrt{(r_4 - L + 5a - b)^2 + (r_4 + 5a + b)^2}$
$d(1,32)$	$r_4 \left[\arccos\left(\frac{r_4 - L + 5a - b}{d}\right) - \arccos\left(\frac{d^2 - r_5^2 + r_4^2}{2dr_4}\right) \right]$	$\sqrt{(r_4 - L + 5a - b)^2 + (r_5 + 5a + b)^2}$
$d(1,33)$	$r_4 \left[\arccos\left(\frac{r_4 - L + 5a - b}{d}\right) - \arccos\left(\frac{d^2 - r_6^2 + r_4^2}{2d^2}\right) \right]$	$\sqrt{(r_4 - L + 5a - b)^2 + (r_6 + 5a + b)^2}$
$d(1,34)$	$r_4 \arccos\left(\frac{r_4 - L + 5a + 3b}{r_4}\right)$	-
$d(1,35)$	$r_4 \arccos\left(\frac{d^2 - r_7^2 + r_4^2}{2d^2}\right)$	$r_4 - L + 6a + r_7$
$d(1,36)$	$r_5 \left[\frac{\pi}{2} - \arccos\left(\frac{d^2 - r_3^2 + r_4^2}{2dr_4}\right) + \arctan\left(\frac{r_3 - 6a - r_4 + L}{L + 2b}\right) \right]$	$\sqrt{(L+2b)^2 + (r_3 - 6a - r_4 + L)^2}$
$d(1,37)$	$r_4 \left[\frac{\pi}{2} - \arccos\left(\frac{d^2 - r_2^2 + r_4^2}{2dr_4}\right) - \arctan\left(\frac{r_4 - L + 6a - r_2}{L + 2b}\right) \right]$	$\sqrt{(L+2b)^2 + (r_4 - L + 6a - r_2)^2}$
$d(1,38)$	$r_4 \arccos\left(\frac{r_4 - L + 5a - b}{r_4}\right)$	-
$d(39,40)$	$r_7 \left[\arcsin\left(\frac{L}{r_7}\right) - \arccos\left(\frac{d}{r_7}\right) + \arccos\left(\frac{r_7 - 5a - b}{d}\right) \right]$	$\sqrt{(r_7 - 5a - b)^2 + (r_7 - 5a - b)^2}$
$d(39,41)$	$r_7 \left[\arcsin\left(\frac{L+2b}{r_7}\right) - \arcsin\left(\frac{L-3a+b}{r_7}\right) \right]$	-
$d(39,42)$	$r_7 \left[\arccos\left(\frac{r_7^2 - r_6^2 + d^2}{2dr_7}\right) - \arcsin\left(\frac{L+2b}{d}\right) + \arcsin\left(\frac{L+2b}{r_7}\right) \right]$	$\sqrt{(L+2b)^2 + (r_7 - 5a - b)^2}$
$d(39,43)$	$r_7 \left[\arcsin\left(\frac{L+2b}{r_7}\right) - \arcsin\left(\frac{r_5 + 5a + b}{d}\right) + \arccos\left(\frac{r_7^2 - r_5^2 + d^2}{2dr_7}\right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_7 - 5a - b)^2}$
$d(39,44)$	$r_7 \left[\arccos\left(\frac{r_7^2 - r_4^2 + d^2}{2dr_7}\right) - \arcsin\left(\frac{r_4 + 5a + b}{d}\right) + \arcsin\left(\frac{L+2b}{r_7}\right) \right]$	$\sqrt{(r_4 + 5a + b)^2 + (r_7 - 5a - b)^2}$
$d(39,45)$	$r_7 \left[\arcsin\left(\frac{L+2b}{r_7}\right) - \arccos\left(\frac{r_7^2 - r_4^2 + d^2}{2dr_7}\right) \right]$	$r_7 - r_4 + L - 10a$
$d(39,46)$	$r_7 \left[\arcsin\left(\frac{L+2b}{r_7}\right) - \arccos\left(\frac{r_7^2 - r_5^2 + d^2}{2dr_7}\right) \right]$	$r_7 - r_5 + L - 10a$
$d(39,47)$	$r_7 \left[\arcsin\left(\frac{L+2b}{r_7}\right) - \arccos\left(\frac{r_7^2 - r_6^2 + d^2}{2dr_7}\right) \right]$	$r_7 - 5a - b$

$d(39,48)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arcsin \left(\frac{3a+b}{r_7} \right) \right]$	-
$d(39,49)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d^2 - r_5^2 + r_7^2}{2dr_7} \right) - \arctan \left(\frac{r_5 + 5a - L - b}{r_7 - 5a + L + b} \right) \right]$	$\sqrt{(r_5 - L + 5a - b)^2 + (r_7 - 5a + L + b)^2}$
$d(39,50)$	$r_7 \arcsin \left(\frac{L+2b}{r_7} \right)$	-
$d(39,51)$	$r_7 + a + b - \sqrt{r_7^2 - (3a+b)^2}$	-
$d(39,52)$	$3a + b$	-
$d(39,53)$	$\sqrt{r_7^2 - (3a+b)^2} - r_7 + 5a + b$	-
$d(39,54)$	$\sqrt{r_6^2 - (3a+b)^2}$	-
$d(39,55)$	$\sqrt{r_5^2 - (3a+b)^2} - r_5 + L - 5a + b$	-
$d(39,56)$	$\sqrt{r_4^2 - (3a+b)^2} - r_4 + L - 5a + b$	-
$d(39,57)$	$L + 2b - \sqrt{r_6^2 - (3a+b)^2}$	-
$d(39,58)$	$r_7 + L - 5a + b - \sqrt{r_7^2 - (L - 3a + b)^2}$	-
$d(39,59)$	$L + b - 3a$	-
$d(39,60)$	$\sqrt{r_7^2 - (L - 3a + b)^2} - r_7 + b + L - a$	-
$d(39,61)$	$L + 2b - [\sqrt{r_4^2 - (L - 3a + b)^2} - r_4 + b + L - 5a]$	-
$d(39,62)$	$L + 2b - [\sqrt{r_3^2 - (3a+b)^2} - r_3 + a + b]$	-
$d(39,63)$	$L + 2b$	-
$d(39,64)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d}{r_7} \right) + \arctan \left(\frac{r_7 + a - L - b}{r_7 + a + b} \right) \right]$	$\sqrt{(r_7 + a - L - b)^2 + (r_7 + a + b)^2}$
$d(39,65)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arcsin \left(\frac{L - 3a + b}{r_7} \right) \right]$	-
$d(39,66)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d^2 - r_4^2 + r_7^2}{2dr_7} \right) \right]$	$r_4 - L + r_7 + 6a$
$d(39,67)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d^2 - r_5^2 + r_7^2}{2dr_7} \right) \right]$	$r_5 - L + r_7 + 6a$
$d(39,68)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d^2 - r_6^2 + r_7^2}{2dr_7} \right) \right]$	$r_6 - L + 6a + r_7$
$d(39,69)$	$r_7 \left[\arccos \left(\frac{d^2 - r_5^2 + r_7^2}{2dr_7} \right) - \arcsin \left(\frac{r_5 + 5a + b}{d} \right) + \arcsin \left(\frac{L+2b}{r_7} \right) \right]$	$\sqrt{(r_5 + 5a + b)^2 + (r_7 + a + b)^2}$
$d(39,70)$	$r_7 \left[\arccos \left(\frac{d^2 - r_4^2 + r_7^2}{2dr_7} \right) - \arcsin \left(\frac{r_4 + 5a + b}{d} \right) + \arcsin \left(\frac{L+2b}{r_7} \right) \right]$	$\sqrt{(r_4 + 5a + b)^2 + (r_7 + a + b)^2}$
$d(39,71)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d}{r_7} \right) + \arccos \left(\frac{r_7 - L + a - b}{d} \right) \right]$	$\sqrt{(r_7 - L + a - b)^2 + (r_7 - 5a - b)^2}$
$d(39,72)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arcsin \left(\frac{3a+b}{r_7} \right) \right]$	-
$d(39,73)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{r_7 - L + a - b}{d} \right) + \arccos \left(\frac{d}{r_7} \right) \right]$	$\sqrt{(r_7 - L + a - b)^2 + (r_7 + a + b)^2}$
$d(39,74)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{d^2 - r_3^2 + r_7^2}{2dr_7} \right) + \arccos \left(\frac{r_7 + a + b}{d} \right) \right]$	$\sqrt{(r_3 - a - b)^2 + (r_7 + a + b)^2}$
$d(39,75)$	$r_7 \left[\arcsin \left(\frac{L+2b}{r_7} \right) - \arccos \left(\frac{r_2^2 - r_7^2 + d^2}{2dr_7} \right) + \arccos \left(\frac{r_7 + a + b}{d} \right) \right]$	$\sqrt{(r_2 - a - b)^2 + (r_7 + a + b)^2}$
$d(39,76)$	$r_7 \arcsin \left(\frac{L+2b}{r_7} \right)$	-
$d(77,78)$	$r_3 \left[\frac{\pi}{2} - \arccos \left(\frac{d^2 - r_7^2 + r_3^2}{2dr_3} \right) - \arcsin \left(\frac{r_3 - a - b}{d} \right) \right]$	$\sqrt{(r_3 - a - b)^2 + (r_7 + a + b)^2}$
$d(77,79)$	$r_3 \left[\frac{\pi}{2} - \arccos \left(\frac{d^2 - r_4^2 + r_3^2}{2dR_3} \right) - \arccos \left(\frac{L+2b}{d} \right) \right]$	$\sqrt{((r_3 - r_4 + L - 6a))^2 + (L + 2b)^2}$
$d(77,80)$	$r_3 \arcsin \left(\frac{3a+b}{r_3} \right)$	-
$d(77,81)$	$r_3 \left[\frac{\pi}{2} - \arccos \left(\frac{d^2 - r_5^2 + r_3^2}{2dr_3} \right) - \arccos \left(\frac{L+2b}{d} \right) \right]$	$\sqrt{(r_3 - r_5 + L - 6a)^2 + (L + 2b)^2}$
$d(77,82)$	$r_3 \arcsin \left(\frac{5a+b}{r_3} \right)$	-
$d(77,83)$	$r_2 \left[\frac{\pi}{2} - \arccos \left(\frac{d^2 - r_7^2 + r_2^2}{2dr_2} \right) - \arccos \left(\frac{r_7 + a + b}{d} \right) \right]$	$\sqrt{(r_2 - a - b)^2 + (r_7 + a + b)^2}$
$d(77,84)$	$r_2 \left[\frac{\pi}{2} - \arccos \left(\frac{d^2 - r_4^2 + r_2^2}{2dr_2} \right) + \arccos \left(\frac{L+2b}{d} \right) \right]$	$\sqrt{(r_2 - r_4 + L - 6a)^2 + (L + 2b)^2}$
$d(77,85)$	$r_2 \arcsin \left(\frac{3a+b}{r_2} \right)$	-
$d(77,86)$	$\frac{\pi r_2}{2}$	-

APPENDIX B. CONFLICT PATTERNS BETWEEN MOVEMENTS

		S1			S2			S3			E1			E2			E3			N1			N2			N3			W1			W2			W3		
		W1	W2	W3	N1	N2	N3	E1	E2	E3	S1	S2	S3	W1	W2	W3	N1	N2	N3	E1	E2	E3	S1	S2	S3	W1	W2	W3	N1	N2	N3	E1	E2	E3	S1	S2	S3
S1	W1	2	2	2	0	0	0	0	0	0	6	6	6	5	0	0	0	0	0	0	0	0	5	5	5	7	0	0	6	6	6	5	5	5	0	0	0
	W2	2	2	2	0	0	0	0	0	0	6	6	6	5	5	0	0	0	0	0	0	0	5	5	5	7	7	0	6	6	6	5	5	5	0	0	0
	W3	2	2	2	0	0	0	0	0	0	6	6	6	5	5	5	0	0	0	0	0	0	5	5	5	7	7	7	6	6	6	5	5	5	0	0	0
S2	N1	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	0	0	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0
	N2	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	7	0	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0
	N3	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	7	7	4	4	4	0	0	0	0	0	0	0	7	3	3	3	0	0	0	
S3	E1	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	
	E2	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	
	E3	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	
E1	S1	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	0	0	0	0	0	0	0	5	5	5	7	0	0	
	S2	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	5	0	0	0	0	0	5	5	5	7	7	0		
	S3	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	5	5	0	0	0	0	5	5	5	7	7	7		
E2	W1	7	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	0	0	4	4	4	0	0	0	0	0	
	W2	0	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	7	0	4	4	4	0	0	0	0	0	
	W3	0	0	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	4	4	4	3	3	3	7	7	7	4	4	4	0	0	0	0	0	
E3	N1	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0
	N2	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	
	N3	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
N1	E1	0	0	0	5	5	5	7	0	0	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	0	0	0	0	0
	E2	0	0	0	5	5	5	7	7	0	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	5	0	0	0	0
	E3	0	0	0	5	5	5	7	7	7	6	6	6	5	5	5	0	0	0	2	2	2	0	0	0	0	0	0	6	6	6	5	5	5	0	0	0
N2	S1	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	5	5	5	3	3	3	7	0	0
	S2	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	5	5	5	3	3	3	7	7	0
	S3	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	5	5	5	3	3	3	7	7	7
N3	W1	6	6	6	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0
	W2	0	6	6	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	
	W3	0	0	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0
W1	N1	6	6	6	5	0	0	0	0	0	0	0	5	5	5	7	0	0	6	6	6	4	4	4	0	0	0	2	2	2	0	0	0	0	0	0	0
	N2	6	6	6	5	5	0	0	0	0	0	0	5	5	5	7	7	0	6	6	6	4	4	4	0	0	0	2	2	2	0	0	0	0	0	0	
	N3	6	6	6	5	5	5	0	0	0	0	0	5	5	5	7	7	7	6	6	6	4	4	4	0	0	0	2	2	2	0	0	0	0	0	0	0
W2	E1	4	4	4	3	3	3	7	0	0	4	4	4	0	0	0	0	0	0	7	7	7	3	3	3	0	0	0	0	0	1	1	1	0	0	0	0
	E2	4	4	4	3	3	3	7	7	0	4	4	4	0	0	0	0	0	0	7	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	0
	E3	4	4	4	3	3	3	7	7	7	4	4	4	0	0	0	0	0	0	7	3	3	3	0	0	0	0	0	0	1	1	1	0	0	0	0	0
W3	S1	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	2	2	2	2
	S2	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	2	2	2	2
	S3	0	0	0	0	0	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	2	2	2	2

APPENDIX C. THE CROSSING STRATEGY OF AN AV

```

// n is the amount of preceding vehicles.
// t0 is the initial time.
//  $\widehat{ET}$  is the fastest entry time of the vehicle arriving at the intersection without delay.
// v0, vE, vC are the initial speed, entry speed, and limited speed, respectively
Begin
    Calculate the fastest entry time  $\widehat{ET}$  of the new incoming CAV by Eq. (9);
    Initialize the permissive entry time  $ET \leftarrow \widehat{ET}$ ;
    For k = 1 to n Do
        If its spatial trajectory is in conflict with that of the preceding vehicle k Then
            If  $ET_k - \zeta^L < ET_k - \zeta^U$ , where  $\zeta^L, \zeta^U \in \{\zeta_1, \zeta_2, \zeta_3, \zeta_4, \zeta_5\}$  Then
                 $ET_k \leftarrow ET_k - \zeta^U$ ;
            End if
        End if
    End for
End

```

APPENDIX D. COMPUTATION EXPRESSIONS OF RADIUS IN AN UNSIGNALIZED INTERSECTION

Name	Expression
r_1	$b + a$
r_2	$[(b + a)^2 + (b + 3a)^2] / (2a + 2b)$
r_3	$[(b + a)^2 + (b + 5a)^2] / (2a + 2b)$
r_4	$[(L - 5a + b)^2 + (L - a + b)^2] / (2L + 2b - 10a)$
r_5	$[(L - 5a + b)^2 + (L - 3a + b)^2] / (2L + 2b - 10a)$
r_6	$L + b - 5a$
r_7	$a + (L + 2b)^2 / 4a$

