Vehicle density M (x)

x_t	x_{t-k}	$x_t-\bar{x}$	$x_{t-1}-\bar{x}$	$(x_t-\bar{x})^2$	$(x_t-\bar{x})(x_{t-1}-\bar{x})$	at k=2 x_t	x_{t-2}	$x_{t-2}-\bar{x}$	$x_t-\bar{x}$	$(x_{t-2}-\bar{x})(x_t-\bar{x})$
10		-25		625		10			-25	
20	10	-15	-25	225	375	20			-15	
30	20	-5	-15	25	75	30	10	-25	-5	125
40	30	5	-5	25	-25	40	20	-15	5	-75
50	40	15	5	225	75	50	30	-5	15	-75
60	50	25	15	625	375	60	40	5	25	125
Sum				1750	875					100

$$\bar{x} = \frac{10+20+30+40+50+60}{6} = \frac{210}{6} = 35$$

$$\gamma_{xx}(k) = \frac{\sum_{t=1}^{n-k}(x_t-\bar{x})(x_{t+k}-\bar{x})}{\sum_{t=1}^{n}(x_t-\bar{x})^2}$$

$$\gamma_{xx}(1) = \frac{875}{1750} = 0.5$$

$$\gamma_{xx}(2) = \frac{100}{1750} = 0.057714$$

$$\bar{y} = \frac{70+65+58+50+45+40}{6} = 54.667$$

Travel speed (y)

y_t	y_{t-k}	$y_t-\bar{y}$	$y_{t-1}-\bar{y}$	$(y_t-\bar{y})(y_{t-1}-\bar{y})$	$(y_t-\bar{y})^2$	at k=2 y_t	y_{t-k}	$y_{t-2}-\bar{y}$	$y_t-\bar{y}$	$(y_t-\bar{y})(y_{t-2})$
70		15.333			235.11	70			15.333	
65	70	10.333	15.333	158.444	106.778	65			10.333	
58	65	3.333	10.333	34.444	11.111	58	70	15.333	3.333	51.11
50	58	-4.667	3.333	-15.555	21.778	50	65	10.333	-4.667	-48.222
45	50	-9.667	-4.667	45.111	93.444	45	58	3.333	-9.667	-32.222
40	45	-14.667	-9.667	141.778	215.11	40	50	-4.667	-14.667	68.444
Sum				364.222	683.33					39.111

$$\gamma_{yy}(k) = \frac{\sum_{t=1}^{n-k}(y_t-\bar{y})(y_{t-k}-\bar{y})}{\sum_{t=1}^{n}(y_t-\bar{y})^2}$$

at k=1
$$\gamma_{yy}(1) = \frac{364.222}{683.333} = 0.533$$

$$\gamma_{yy}(2) = \frac{39.111}{683.333} = 0.0572$$