$V_x = (V_{x1}, V_{x2}, V_{x3}) V_y = (V_{y1}, V_{y2}, V_{y3})$

$$V_x V_y = \sum_{i=1}^{3} v_{xi} v_{yi} = 0$$

$v_x =$
$(2, 0, 0), v_y =$
$(0, 2, 0), v_z =$
$(0, 0, 2)$
$A =$
$(2, 5, 8)\{v_x, v_y, v_z\}$

$$A = v_x + 2.5 v_y + 4 v_z$$

$\{1, \cos(n\omega t), \sin(n\omega t), \ldots\}, n =$
$1, 2, \ldots (t_0, t_0, T), T =$
$2\pi/\omega$
$f(t) =$
$\frac{a_0}{2} +$
$\sum_{n=1}^{\infty} a_n \cos(n\omega t) +$
$\sum_{n=1}^{\infty} b_n \sin(n\omega t)$
$a_n =$
$\frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \cos(n\omega t) dt$
$b_n =$
$\frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \sin(n\omega t) dt$

	$f(t)$	$x(t)$
$\{v_x, v_y\}$	$\{1, \cos(n\omega t), \sin(n\omega t)\}$	$\{f_1(t), f_2(t), \ldots, f_k(t)\}$
$C_k = A$	$a_n = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \cos(n\omega t) dt$	$x_k = \int_0^T f_k(t) x(t) dt$
k	$b_n = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \sin(n\omega t) dt$	
$A = C_1 v_x + C_2 v_y$	$f(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos(n\omega t) + \sum_{n=1}^{\infty} b_n \sin(n\omega t)$	$x(t) = \lim_{N\to\infty} \sum_{k=1}^{N} x_k f_k(t)$

$s(t)$
$x(t)$

$$\lim_{N\to\infty} \sum_{k=1}^{N} x_k f_k(t) x(t)$$

$x(t) =$
$\lim_{N\to\infty}^{N} \sum_{k=1}^{N} x_k f_k(t)$
$x_k =$
$\int_0^T x(t) f_k(t) dt, k =$
$1, 2, \ldots$
$x(t) x_k x(t) x_k x(t) \{f_k(t)\} \quad x_k (k =$
$1, 2, \ldots)$
$\{f_k\} x_k$
$\boxed{x_k, s_k, n_k}$
x_k, s_k, n_k

$$x(t) = s(t) + n(t); x_k = s_k + n_k$$

$x(t) x_k s(t) s_k n(t) n_k$
$k =$
$\int_0^T f_k(t) x(t) dt$
$=$
$\int_0^T f_k(t)(s(t) +$
$n(t)) dt$
$=$
$\int_0^T f_k(t) s(t) dt +$
$\int_0^T f_k(t) n(t)) dt$
$=$
$s_k +$
n_k
$x(t) =$
$s(t) +$
$n(t)$
$\{f_k(t)\}$
$k =$
$1, 2, \ldots$
$x(t) x_k$
$x_k =$

$=$
$E\left[\int_0^T f_k(t)s(t)dt + \int_0^T f_k(t)n(t))dt\right]$
$=$
$E[s_k+$
$n_k]$
$=$
$E[s_k]+$
$E[n_k](by E[n(t)] =$
$0 E[n_k] =$
$0)$
$=$
$E[s_k] =$
$s_k()$
$\boxed{x_k}$
$_k] =$
$E\left[\int_0^T f_k(t)x(t)dt\right] =$
$E\left[\int_0^T f_k(t)(s(t)+n(t))dt\right]$
$=$
$E\left[\int_0^T f_k(t)s(t)dt + \int_0^T f_k(t)n(t))dt\right]$
$=$
$E\left[\int_0^T f_k(t)s(t)dt\right]+$
$E\left[\int_0^T f_k(t)n(t))dt\right]$
$=$
$E\left[\int_0^T f_k(t)s(t)dt\right]+$
$\int_0^T f_k(t)E[n(t))]dt(by E[n(t)] =$
$0)$
$=$
$E\left[\int_0^T f_k(t)s(t)dt\right]$
$=$
$E[s_k] =$
$s_k()$
$\boxed{x_j x_k}$
$_j-$
$E(x_j))(x_k-$
$E(x_k))] =$
$E[(x_j-$
$s_j)(x_k-$
$s_k)]$
$=$
$E\left[\left(\int_0^T f_j(t)x(t)dt - s_j\right)\left(\int_0^T f_k(t)x(t)dt - s_k\right)\right]$
$=$
$E\left[\left(\int_0^T f_j(t)(s(t)+n(t))dt - s_j\right)\left(\int_0^T f_k(t)(s(t)+n(t))dt - s_k\right)\right]$
$=$
$E\left[\left(\int_0^T f_j(t)n(t)dt\right)\left(\int_0^T f_k(t)n(t)dt\right)\right] =$
$E\left[\left(\int_0^T f_j(t)n(t)dt\right)\left(\int_0^T f_k(u)n(t)du\right)\right]$
$=$
$E\left[\int_0^T f_j(t)\left[\int_0^T n(t)n(u)f_k(u)du\right]dt\right] =$
$\int_0^T f_j(t)\left[\int_0^T E[n(t)n(u)]f_k(u)du\right]dt$
$=$
$\int_0^T f_j(t)\left[\int_0^T r_n(t-u)f_k(u)du\right]dt(by E[n(t_j)n(t_k)] =$
$r_n(t_k-$
$t_j))$
$x(t)\dot{x}_j x_k$

$$E[(x_j - E(x_j))(x_k - E(x_k))] = E[(x_j - s_j)(x_k - s_k)] = \lambda_k \delta_{jk}$$

$\delta_{jk} =$
$\{1, (j =$
$k)$
$0, (j \neq$
$k)$
$\lambda_k x_k$
$k =$
$1, 2, \ldots$
$j \neq$
k
$E[(x_j-$
$s_j)(x_k-$
$s_k)] =$
0
$j =$
k
$E[(x_j-$
$s_j)(x_k-$
$s_k)] =$