

In[27]:= **Clear["Global`\*"];**

清除

**AA = {**  
     **{1, x1, x1<sup>2</sup>, x1<sup>3</sup>},**  
     **{0, 1, 2 x1, 3 x1<sup>2</sup>},**  
     **{1, x2, x2<sup>2</sup>, x2<sup>3</sup>},**  
     **{0, 1, 2 x2, 3 x2<sup>2</sup>}**  
**};**

**φ = Dot[{1, x, x<sup>2</sup>, x<sup>3</sup>}, Inverse[AA]] // FullSimplify;**  
     点积      逆      完全简化

**φ // TraditionalForm**  
     传统格式

Out[30]//TraditionalForm=

$$\left\{ -\frac{(x-x2)^2(2x-3x1+x2)}{(x1-x2)^3}, \frac{(x-x1)(x-x2)^2}{(x1-x2)^2}, \frac{(x-x1)^2(2x+x1-3x2)}{(x1-x2)^3}, \frac{(x-x1)^2(x-x2)}{(x1-x2)^2} \right\}$$

In[31]:= **rule = {x2 → x1 + h, x → x1 + t};**

**φ /. rule // FullSimplify // TraditionalForm**  
     完全简化      传统格式

Out[32]//TraditionalForm=

$$\left\{ \frac{(h-t)^2(h+2t)}{h^3}, \frac{t(h-t)^2}{h^2}, \frac{t^2(3h-2t)}{h^3}, \frac{t^2(t-h)}{h^2} \right\}$$

In[33]:= **∂<sub>x</sub> φ /. rule // FullSimplify // TraditionalForm**  
     完全简化      传统格式

Out[33]//TraditionalForm=

$$\left\{ \frac{6t(t-h)}{h^3}, \frac{(h-3t)(h-t)}{h^2}, \frac{6t(h-t)}{h^3}, \frac{t(3t-2h)}{h^2} \right\}$$

In[34]:= **φ2 = ∂<sub>x,x</sub> φ // FullSimplify;**  
     完全简化

**φ2 /. rule // FullSimplify // TraditionalForm**  
     完全简化      传统格式

Out[35]//TraditionalForm=

$$\left\{ -\frac{6(h-2t)}{h^3}, \frac{6t-4h}{h^2}, \frac{6(h-2t)}{h^3}, -\frac{2(h-3t)}{h^2} \right\}$$

In[36]:= **kpart = ∫<sub>x1</sub><sup>x2</sup> (KroneckerProduct[φ2, φ2]) dx // FullSimplify;**  
     克罗内克积      完全简化

**kpart /. rule // TraditionalForm**  
     传统格式

Out[37]//TraditionalForm=

$$\begin{pmatrix} \frac{12}{h^3} & \frac{6}{h^2} & -\frac{12}{h^3} & \frac{6}{h^2} \\ \frac{6}{h^2} & \frac{4}{h} & -\frac{6}{h^2} & \frac{2}{h} \\ -\frac{12}{h^3} & -\frac{6}{h^2} & \frac{12}{h^3} & -\frac{6}{h^2} \\ \frac{6}{h^2} & \frac{2}{h} & -\frac{6}{h^2} & \frac{4}{h} \end{pmatrix}$$

In[38]:= **bpart** =  $\int_{x1}^{x2} \phi \, dx$  // **FullSimplify**;  
| 完全简化

**bpart /. rule // FullSimplify // TraditionalForm**  
| 完全简化      | 传统格式

Out[39]//TraditionalForm=

$$\left\{ \frac{h}{2}, \frac{h^2}{12}, \frac{h}{2}, -\frac{h^2}{12} \right\}$$