Integral along the component axis

```
Integrate[ Sin[p2 * Pi * y / L] * y * Sin[p1 * Pi * y / L], {y, 0, L}]
```

Out[ ]=
$$\frac{1}{(p1-p2)^2\,(p1+p2)^2\,\pi^2}$$
$$L^2\,\left(-2\,p1\,p2-p2\,\left(-p1^2+p2^2\right)\,\pi\,\text{Cos}[p2\,\pi]\,\text{Sin}[p1\,\pi]+p1^2\,\text{Sin}[p1\,\pi]\,\text{Sin}[p2\,\pi]+\right.$$
$$\left.p2^2\,\text{Sin}[p1\,\pi]\,\text{Sin}[p2\,\pi]+\text{Cos}[p1\,\pi]\,\left(2\,p1\,p2\,\text{Cos}[p2\,\pi]+p1\,\left(-p1^2+p2^2\right)\,\pi\,\text{Sin}[p2\,\pi]\right)\right)$$

Integrals not along the component axis

In[ ]:=
```
Integrate[ Sin[p2 * Pi * y / L] * Sin[p1 * Pi * y / L], {y, 0, L}]
```

Out[ ]=
$$\frac{L\,p2\,\text{Cos}[p2\,\pi]\,\text{Sin}[p1\,\pi]-L\,p1\,\text{Cos}[p1\,\pi]\,\text{Sin}[p2\,\pi]}{p1^2\,\pi-p2^2\,\pi}$$