```
Mat = {{ 0, -Cos[k x], pm Sin[k x]},
    {k, 0, 0},
    {0, pm Sin[k x], Cos[k x]}
   };
Mat // MatrixForm
```

$$\begin{pmatrix} 0 & -\text{Cos}[k\,x] & \text{pm}\,\text{Sin}[k\,x] \\ k & 0 & 0 \\ 0 & \text{pm}\,\text{Sin}[k\,x] & \text{Cos}[k\,x] \end{pmatrix}$$

```
Img = Mat.{x, y, z};
Img // MatrixForm
```

$$\begin{pmatrix} -y\,\text{Cos}[k\,x] + \text{pm}\,z\,\text{Sin}[k\,x] \\ k\,x \\ z\,\text{Cos}[k\,x] + \text{pm}\,y\,\text{Sin}[k\,x] \end{pmatrix}$$

```
(* Gradient of function *)
Gr[f_] := { D[f, x], D[f, y], D[f, z]}
```

```
Gr[x^2 + y^2 + z]
```

$$\{2\,x,\ 2\,y,\ 1\}$$

```
Gr[ Img[[3]] ] + pm Img[[1]] Gr[ Img[[2]] ]
```

$$\{k\,\text{pm}\,y\,\text{Cos}[k\,x] - k\,z\,\text{Sin}[k\,x] + k\,\text{pm}\,(-y\,\text{Cos}[k\,x] + \text{pm}\,z\,\text{Sin}[k\,x]),\ \text{pm}\,\text{Sin}[k\,x],\ \text{Cos}[k\,x]\}$$

```
Simplify[%]
```

$$\left\{k\left(-1+\text{pm}^2\right)\,z\,\text{Sin}[k\,x],\ \text{pm}\,\text{Sin}[k\,x],\ \text{Cos}[k\,x]\right\}$$

```
(* pm = +1 or -1 *)
% /. {pm^2 → 1}
```

$$\{0,\ \text{pm}\,\text{Sin}[k\,x],\ \text{Cos}[k\,x]\}$$