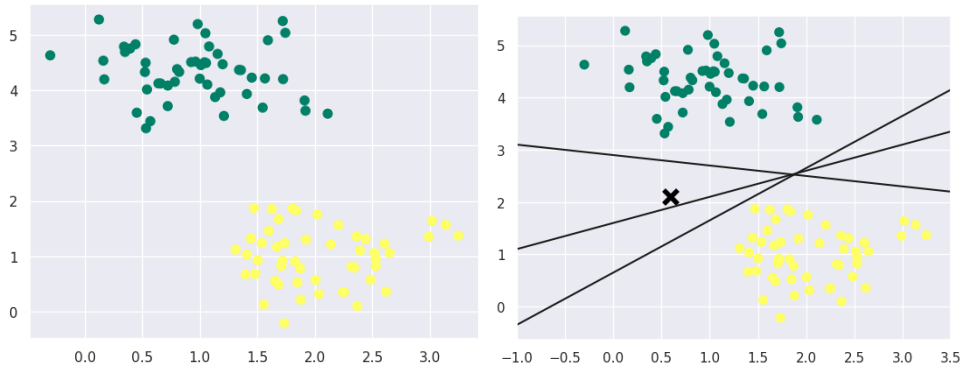
Program :

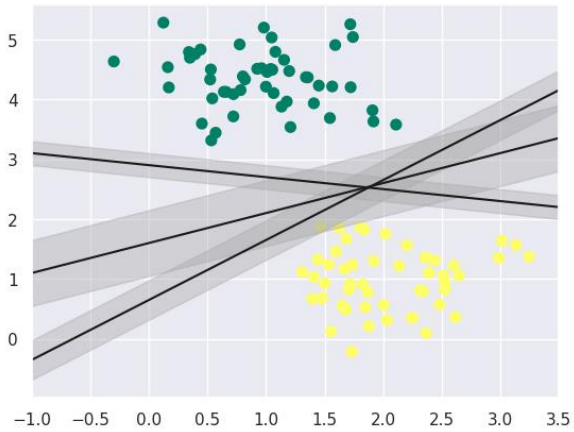
```
import numpy as np
import matplotlib.pyplot as plt
from scipy import stats
import seaborn as sns; sns.set()
```

```
from sklearn.datasets import make_blobs
X, y = make_blobs(n_samples=100, centers=2, random_state=0, cluster_std=0.50)
plt.scatter(X[:, 0], X[:, 1], c=y, s=50, cmap='summer');
```



```
xfit = np.linspace(-1, 3.5)
plt.scatter(X[:, 0], X[:, 1], c=y, s=50, cmap='summer')
plt.plot([0.6], [2.1], 'x', color='black', markeredgewidth=4, markersize=12)
for m, b in [(1, 0.65), (0.5, 1.6), (-0.2, 2.9)]:
   plt.plot(xfit, m * xfit + b, '-k')
plt.xlim(-1, 3.5);
```

```
xfit = np.linspace(-1, 3.5)
plt.scatter(X[:, 0], X[:, 1], c=y, s=50, cmap='summer')
for m, b, d in [(1, 0.65, 0.33), (0.5, 1.6, 0.55), (-0.2, 2.9, 0.2)]:
  yfit = m * xfit + b
  plt.plot(xfit, yfit, '-k')
  plt.fill_between(xfit, yfit - d, yfit + d, edgecolor='none',
                   color='#AAAAAA', alpha=0.4)
  plt.xlim(-1, 3.5);
```



```
from sklearn.svm import SVC # "Support vector classifier"
model = SVC(kernel='linear', C=1E10)
model.fit(X, y)
```

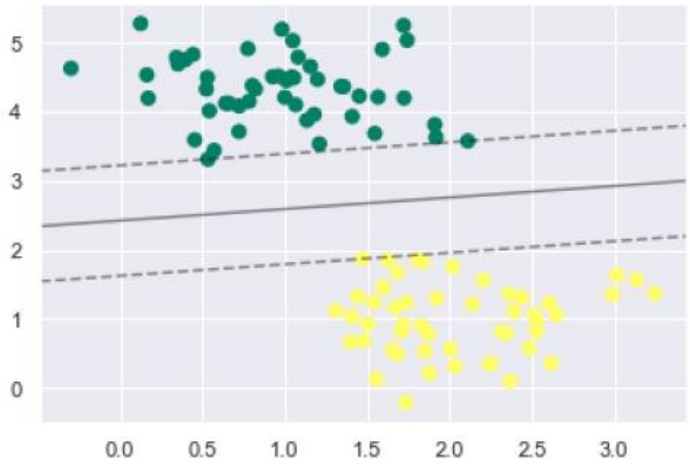
```
SVC(C=10000000000.0, kernel='linear')
```

```
def decision_function(model, ax=None, plot_support=True):
    if ax is None:
        ax = plt.gca()
    xlim = ax.get_xlim()
    ylim = ax.get_ylim()
```

```
ax = plt.gca()
xlim = ax.get_xlim()
ylim = ax.get_ylim()

x = np.linspace(xlim[0], xlim[1], 30)
y = np.linspace(ylim[0], ylim[1], 30)
Y, X = np.meshgrid(y, x)
xy = np.vstack([X.ravel(), Y.ravel()]).T
P = model.decision_function(xy).reshape(X.shape)
```

```
plt.scatter(X[:, 0], X[:, 1], c=y, s=50, cmap='summer')
decision_function(model);
```




```
model.support_vectors_
```

```
array([[0.5323772 , 3.31338909],
       [2.11114739, 3.57660449],
       [1.46870582, 1.86947425]])
```