

Financial Mathematics
The Spectral Theorem

The Spectral Theorem

0034-1. Let $Q(x, y) = 482x^2 - 120xy + 363y^2$.

a. Find a rotation matrix $R \in \mathbb{R}^{2 \times 2}$

s.t. $Q \circ L_R$ is diagonal,

i.e., s.t. $Q(L_R(x, y))$ has no mixed terms.

Hint:

$$\lambda^2 - 845\lambda + 171366 = (\lambda - 338)(\lambda - 507)$$

b. Graph $Q(x, y) = 3000$.

Hint: $\arctan(5/12)$ is about 23° ,
or 0.39 radians.