```
> restart
> EcuaEnDerPar := diff(z(x,y),x$2) + 6·diff(z(x,y),y) = z(x,y)
```

$$EcuaEnDerPar := \frac{\partial^2}{\partial x^2} z(x,y) + 6 \frac{\partial}{\partial y} z(x,y) = z(x,y) \quad (1)$$

```
> EcuaX := diff(P(x),x$2)/P(x) = alpha
```

$$EcuaX := \frac{\frac{d^2}{dx^2} P(x)}{P(x)} = \alpha \quad (2)$$

```
> EcuaY := (-6·diff(Q(y),y) + Q(y))/Q(y) = alpha
```

$$EcuaY := \frac{-6 \frac{d}{dy} Q(y) + Q(y)}{Q(y)} = \alpha \quad (3)$$

```
>
```

para alpha =0

```
> EcuaCeroX := lhs(EcuaX) = 0
```

$$EcuaCeroX := \frac{\frac{d^2}{dx^2} P(x)}{P(x)} = 0 \quad (4)$$

```
> SolGralCeroX := dsolve(EcuaCeroX)
```

$$SolGralCeroX := P(x) = c_1 x + c_2 \quad (5)$$

```
> EcuaCeroY := lhs(EcuaY) = 0
```

$$EcuaCeroY := \frac{-6 \frac{d}{dy} Q(y) + Q(y)}{Q(y)} = 0 \quad (6)$$

```
> SolGralCeroY := dsolve(EcuaCeroY)
```

$$SolGralCeroY := Q(y) = c_1 e^{\frac{y}{6}} \quad (7)$$

```
> SolGralCeroFinal := z(x,y) = rhs(SolGralCeroX)·(subs(c_1 = 1, rhs(SolGralCeroY)))
```

$$SolGralCeroFinal := z(x,y) = (c_1 x + c_2) e^{\frac{y}{6}} \quad (8)$$

```
> EcuaEnDerPar
```

$$\frac{\partial^2}{\partial x^2} z(x,y) + 6 \frac{\partial}{\partial y} z(x,y) = z(x,y) \quad (9)$$

```
> ComprobarUno := simplify(eval(subs(z(x,y) = rhs(SolGralCeroFinal), lhs(EcuaEnDerPar)
      - rhs(EcuaEnDerPar) = 0)))
```

$$ComprobarUno := 0 = 0 \quad (10)$$

```
>
```

para alpha = positiva

> $EcuaPosX := lhs(EcuaX) = \beta^2$

$$EcuaPosX := \frac{\frac{d^2}{dx^2} P(x)}{P(x)} = \beta^2 \quad (11)$$

> $SolGralPosX := dsolve(EcuaPosX)$

$$SolGralPosX := P(x) = c_1 e^{-\beta x} + c_2 e^{\beta x} \quad (12)$$

> $EcuaPosY := lhs(EcuaY) = \beta^2$

$$EcuaPosY := \frac{-6 \frac{d}{dy} Q(y) + Q(y)}{Q(y)} = \beta^2 \quad (13)$$

> $SolGralPosY := dsolve(EcuaPosY)$

$$SolGralPosY := Q(y) = c_1 e^{-\frac{(\beta-1)(\beta+1)y}{6}} \quad (14)$$

> $SolGralPosFinal := z(x,y) = rhs(SolGralPosX) \cdot (subs(c_1 = 1, rhs(SolGralPosY)))$

$$SolGralPosFinal := z(x,y) = \left(c_1 e^{-\beta x} + c_2 e^{\beta x}\right) e^{-\frac{(\beta-1)(\beta+1)y}{6}} \quad (15)$$

> $ComprobarDos := simplify(eval(subs(z(x,y) = rhs(SolGralPosFinal), lhs(EcuaEnDerPar) - rhs(EcuaEnDerPar) = 0)))$

$$ComprobarDos := 0 = 0 \quad (16)$$

>

para alpha = negativa

> $EcuaNegX := lhs(EcuaX) = -\beta^2$

$$EcuaNegX := \frac{\frac{d^2}{dx^2} P(x)}{P(x)} = -\beta^2 \quad (17)$$

> $SolGralNegX := dsolve(EcuaNegX)$

$$SolGralNegX := P(x) = c_1 \sin(\beta x) + c_2 \cos(\beta x) \quad (18)$$

> $EcuaNegY := lhs(EcuaY) = -\beta^2$

$$EcuaNegY := \frac{-6 \frac{d}{dy} Q(y) + Q(y)}{Q(y)} = -\beta^2 \quad (19)$$

> $SolGralNegY := dsolve(EcuaNegY)$

$$SolGralNegY := Q(y) = c_1 e^{\frac{(\beta^2+1)y}{6}} \quad (20)$$

> $SolGralNegFinal := z(x,y) = rhs(SolGralNegX) \cdot (subs(c_1 = 1, rhs(SolGralNegY)))$

$$SolGralNegFinal := z(x,y) = \left(c_1 \sin(\beta x) + c_2 \cos(\beta x)\right) e^{\frac{(\beta^2+1)y}{6}} \quad (21)$$

> $ComprobarTres := simplify(eval(subs(z(x,y) = rhs(SolGralNegFinal), lhs(EcuaEnDerPar)$

$$-rhs(EcuaEnDerPar)=0)))$$

$$ComprobarTres := 0=0 \tag{22}$$

>

otra solucion alterna

> $EcuaXX := \frac{(diff(P(x),x\$2)-P(x))}{-6\cdot P(x)} = \text{alpha}$

$$EcuaXX := -\frac{\frac{d^2}{dx^2}P(x)-P(x)}{6\,P(x)} = \alpha \tag{23}$$

> $EcuaYY := \frac{diff(Q(y),y)}{Q(y)} = \text{alpha}$

$$EcuaYY := \frac{\frac{d}{dy}Q(y)}{Q(y)} = \alpha \tag{24}$$

>

para alpha = cero

> $EcuaCeroXX := lhs(EcuaXX)=0$

$$EcuaCeroXX := -\frac{\frac{d^2}{dx^2}P(x)-P(x)}{6\,P(x)} = 0 \tag{25}$$

> $SolGralCeroXX := dsolve(EcuaCeroXX)$

$$SolGralCeroXX := P(x)=c_1\,e^{x}+c_2\,e^{-x} \tag{26}$$

> $EcuaGralCeroYY := lhs(EcuaYY)=0$

$$EcuaGralCeroYY := \frac{\frac{d}{dy}Q(y)}{Q(y)} = 0 \tag{27}$$

> $SolGralCeroYY := dsolve(EcuaGralCeroYY)$

$$SolGralCeroYY := Q(y)=c_1 \tag{28}$$

> $SolGralCeroCeroFinal := z(x,y)=rhs(SolGralCeroXX)\cdot(subs(c_1=1, rhs(SolGralCeroYY)))$

$$SolGralCeroCeroFinal := z(x,y)=c_1\,e^{x}+c_2\,e^{-x} \tag{29}$$

> $ComprobarCuatro := simplify(eval(subs(z(x,y)=rhs(SolGralCeroCeroFinal), lhs(EcuaEnDerPar)-rhs(EcuaEnDerPar)=0)))$

$$ComprobarCuatro := 0=0 \tag{30}$$

>

para alpha = positiva

> $EcuaPosXX := lhs(EcuaXX)=\beta^2$

(31)

$$EcuaPosXX := -\frac{\frac{d^2}{dx^2} P(x) - P(x)}{6\,P(x)} = \beta^2 \quad (31)$$

> $SolGralPosXX := dsolve(EcuaPosXX)$

$$SolGralPosXX := P(x) = c_1 \sin\left(\sqrt{6\,\beta^2 - 1}\ x\right) + c_2 \cos\left(\sqrt{6\,\beta^2 - 1}\ x\right) \quad (32)$$

> $EcuaPosYY := lhs(EcuaYY) = \beta^2$

$$EcuaPosYY := \frac{\frac{d}{dy} Q(y)}{Q(y)} = \beta^2 \quad (33)$$

> $SolGralPosYY := dsolve(EcuaPosYY)$

$$SolGralPosYY := Q(y) = c_1\, e^{\beta^2 y} \quad (34)$$

> $SolGralPosPosFinal := z(x,y) = rhs(SolGralPosXX) \cdot \left(subs\left(c_1 = 1, rhs(SolGralPosYY)\right)\right)$

$$SolGralPosPosFinal := z(x,y) = \left(c_1 \sin\left(\sqrt{6\,\beta^2 - 1}\ x\right) + c_2 \cos\left(\sqrt{6\,\beta^2 - 1}\ x\right)\right) e^{\beta^2 y} \quad (35)$$

> $ComprobarCinco := simplify(eval(subs(z(x,y) = rhs(SolGralPosPosFinal), lhs(EcuaEnDerPar) - rhs(EcuaEnDerPar) = 0)))$

$$ComprobarCinco := 0 = 0 \quad (36)$$

>

para alpha = negativa

> $EcuaNegXX := lhs(EcuaXX) = -\beta^2$

$$EcuaNegXX := -\frac{\frac{d^2}{dx^2} P(x) - P(x)}{6\,P(x)} = -\beta^2 \quad (37)$$

> $SolGralNegXX := dsolve(EcuaNegXX)$

$$SolGralNegXX := P(x) = c_1 \sin\left(\sqrt{-6\,\beta^2 - 1}\ x\right) + c_2 \cos\left(\sqrt{-6\,\beta^2 - 1}\ x\right) \quad (38)$$

> $EcuaNegYY := lhs(EcuaYY) = -\beta^2$

$$EcuaNegYY := \frac{\frac{d}{dy} Q(y)}{Q(y)} = -\beta^2 \quad (39)$$

> $SolGralNegYY := dsolve(EcuaNegYY)$

$$SolGralNegYY := Q(y) = c_1\, e^{-\beta^2 y} \quad (40)$$

> $SolGralNegNegFinal := z(x,y) = rhs(SolGralNegXX) \cdot \left(subs\left(c_1 = 1, rhs(SolGralNegYY)\right)\right)$

$$SolGralNegNegFinal := z(x,y) = \left(c_1 \sin\left(\sqrt{-6\,\beta^2 - 1}\ x\right) + c_2 \cos\left(\sqrt{-6\,\beta^2 - 1}\ x\right)\right) e^{-\beta^2 y} \quad (41)$$

> $ComprobarSeis := simplify(eval(subs(z(x,y) = rhs(SolGralNegNegFinal), lhs(EcuaEnDerPar) - rhs(EcuaEnDerPar) = 0)))$

$$ComprobarSeis := 0 = 0 \quad (42)$$

>