Los cálculos corresponden al ejemplo para el profesor del documento de Word

```
Clear[alfa, beta, gama, delta, epsilon, d, co, c, v, t, lam]
alfa = 0.084745;
beta = 3 * alfa;
gama = alfa;
delta = 3.99 * alfa;
epsilon = 2.8 * alfa;
F[d_, co_, c_, v_, t_, lam_] =
```

$$d^{alfa} * co^{beta} * c^{gama} * v^{delta} * t^{epsilon} + lam * \left(3 * d + 15 * co + 3 * c + \frac{1}{3} * v + 14 * t - 60\right);$$

```
derd = D[F[d, co, c, v, t, lam], d];
derco = D[F[d, co, c, v, t, lam], co];
derc = D[F[d, co, c, v, t, lam], c];
derv = D[F[d, co, c, v, t, lam], v];
dert = D[F[d, co, c, v, t, lam], t];
derlam = D[F[d, co, c, v, t, lam], lam];
FindRoot[{derd == 0, derco == 0, derc == 0, derv == 0, dert == 0, derlam == 0},
 {{d, 0.5}, {co, 1}, {c, 1}, {v, 0.5}, {t, 1}, {lam, 0.3}}]
```

```
{d → 1.69635, co → 1.01781, c → 1.69635, v → 60.916, t → 1.01781, lam → -0.0737262}
```

Caso hipotético que NO respeta la propuesta original de Cobb – Douglas. Aquí todos los expoentes son iguales a 1. Su suma no es 1.

```
Clear[alfa, beta, gama, delta, epsilon, d, co, c, v, t, lam]
alfa = 1;
beta = 1;
gama = 1;
delta = 1;
epsilon = 1;
F[d_, co_, c_, v_, t_, lam_] =
```

$$d^{alfa} * co^{beta} * c^{gama} * v^{delta} * t^{epsilon} + lam * \left(3 * d + 15 * co + 3 * c + \frac{1}{3} * v + 14 * t - 60\right);$$

```
derd = D[F[d, co, c, v, t, lam], d];
derco = D[F[d, co, c, v, t, lam], co];
derc = D[F[d, co, c, v, t, lam], c];
derv = D[F[d, co, c, v, t, lam], v];
dert = D[F[d, co, c, v, t, lam], t];
derlam = D[F[d, co, c, v, t, lam], lam];
FindRoot[{derd == 0, derco == 0, derc == 0, derv == 0, dert == 0, derlam == 0},
 {{d, 0.5}, {co, 1}, {c, 1}, {v, 0.5}, {t, 1}, {lam, 0.3}}]
```

```
{d → -6.80404 × 10^-7, co → 3.99993, c → -7.98831 × 10^-7,
 v → -9.82959 × 10^-7, t → 0.0000805011, lam → -4.83885 × 10^-24}
```

Se asume que los gastos se distribuyen de manera uniforme, se respeta que la suma de exponentes es igual a 1.

```
Clear[alfa, beta, gama, delta, epsilon, d, co, c, v, t, lam]
alfa = 0.2;
beta = 0.2;
gama = 0.2;
delta = 0.2;
epsilon = 0.2;
F[d_, co_, c_, v_, t_, lam_] =
```

$$d^{alfa} * co^{beta} * c^{gama} * v^{delta} * t^{epsilon} + lam * \left(3 * d + 15 * co + 3 * c + \frac{1}{3} * v + 14 * t - 60\right);$$

```
derd = D[F[d, co, c, v, t, lam], d];
derco = D[F[d, co, c, v, t, lam], co];
derc = D[F[d, co, c, v, t, lam], c];
derv = D[F[d, co, c, v, t, lam], v];
dert = D[F[d, co, c, v, t, lam], t];
derlam = D[F[d, co, c, v, t, lam], lam];
FindRoot[{derd == 0, derco == 0, derc == 0, derv == 0, dert == 0, derlam == 0},
 {{d, 0.5}, {co, 1}, {c, 1}, {v, 0.5}, {t, 1}, {lam, 0.3}}]
```

```
{d → 4., co → 0.8, c → 4., v → 36., t → 0.857143, lam → -0.0551013}
```

Se asume que los gastos se distribuyen de manera uniforme, se respeta que la suma de exponentes es igual a 1. Los ingresos familiares corresponden a una clase económica de nivel medio – alto.

```
Clear[alfa, beta, gama, delta, epsilon, d, co, c, v, t, lam]
alfa = 0.2;
beta = 0.2;
gama = 0.2;
delta = 0.2;
epsilon = 0.2;
F[d_, co_, c_, v_, t_, lam_] = d^alfa * co^beta * c^gama * v^delta * t^epsilon +
    lam * (45 * d + 70 * co + 45 * c + (5 / 3) * v + 60 * t - 3500);
derd = D[F[d, co, c, v, t, lam], d];
derco = D[F[d, co, c, v, t, lam], co];
derc = D[F[d, co, c, v, t, lam], c];
derv = D[F[d, co, c, v, t, lam], v];
dert = D[F[d, co, c, v, t, lam], t];
derlam = D[F[d, co, c, v, t, lam], lam];
FindRoot[{derd == 0, derco == 0, derc == 0, derv == 0, dert == 0, derlam == 0},
 {{d, 0.5}, {co, 1}, {c, 1}, {v, 0.5}, {t, 1}, {lam, 0.3}}]
```

```
{d → 15.5556, co → 10., c → 15.5556, v → 420., t → 11.6667, lam → -0.00742549}
```