Tenemos la siguiente imagen

Y ↓ \ x→	0	1	2	3
0	16	2	3	16
1	5	11	10	8
2	9	7	6	12
3	4	14	15	1

Aplicar la Transformada de Fourier

$F(u,v) = \sum_{x=0}^{M-1}\sum_{y=0}^{N-1} f(x,y)\exp(-2\pi j(\frac{ux}{M}+\frac{vy}{N}))$ para *u=0,1,2,3,…,M-1; v=0,1,2,3,…,N-1*

$f(x,y) = \frac{1}{MN}\sum_{u=0}^{M-1}\sum_{v=0}^{N-1} f(u,v)\exp(2\pi j(\frac{ux}{M}+\frac{vy}{N}))$ para *x=0,1,2,3,…,M-1; y=0,1,2,3,…,N-1*

M=4; N=4

Comenzamos con *u=0 y v=0*

$$F(0,0) = 16e^{-2\pi j\left(\frac{0*0}{4}+\frac{0*0}{4}\right)} + 5e^{-2\pi j\left(\frac{0*0}{4}+\frac{0*1}{4}\right)} + 9e^{-2\pi j\left(\frac{0*0}{4}+\frac{0*2}{4}\right)} + 4e^{-2\pi j\left(\frac{0*0}{4}+\frac{0*3}{4}\right)}$$
$$+2e^{-2\pi j\left(\frac{0*1}{4}+\frac{0*0}{4}\right)} + 11e^{-2\pi j\left(\frac{0*1}{4}+\frac{0*1}{4}\right)} + 7e^{-2\pi j\left(\frac{0*1}{4}+\frac{0*2}{4}\right)} + 14e^{-2\pi j\left(\frac{0*1}{4}+\frac{0*3}{4}\right)}$$
$$+3e^{-2\pi j\left(\frac{0*2}{4}+\frac{0*0}{4}\right)} + 10e^{-2\pi j\left(\frac{0*2}{4}+\frac{0*1}{4}\right)} + 6e^{-2\pi j\left(\frac{0*2}{4}+\frac{0*2}{4}\right)} + 15e^{-2\pi j\left(\frac{0*2}{4}+\frac{0*3}{4}\right)}$$
$$+16e^{-2\pi j\left(\frac{0*3}{4}+\frac{0*0}{4}\right)} + 8e^{-2\pi j\left(\frac{0*3}{4}+\frac{0*1}{4}\right)} + 12e^{-2\pi j\left(\frac{0*3}{4}+\frac{0*2}{4}\right)} + 1e^{-2\pi j\left(\frac{0*3}{4}+\frac{0*3}{4}\right)}$$

Como $e^0 = 1$

$F(0,0)$ =16+5+9+4+2+11+7+14+3+10+6+15+13+8+12+1

$F(0,0)$ =**136**

En EXEL:

Para u=0; v=0

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0	-6.28318531	0	1	0	2	0
0	2	3	0	0	-6.28318531	0	1	0	3	0
0	3	13	0	0	-6.28318531	0	1	0	13	0
1	0	5	0	0	-6.28318531	0	1	0	5	0
1	1	11	0	0	-6.28318531	0	1	0	11	0
1	2	10	0	0	-6.28318531	0	1	0	10	0
1	3	8	0	0	-6.28318531	0	1	0	8	0
2	0	9	0	0	-6.28318531	0	1	0	9	0
2	1	7	0	0	-6.28318531	0	1	0	7	0
2	2	6	0	0	-6.28318531	0	1	0	6	0
2	3	12	0	0	-6.28318531	0	1	0	12	0
3	0	4	0	0	-6.28318531	0	1	0	4	0
3	1	14	0	0	-6.28318531	0	1	0	14	0
3	2	15	0	0	-6.28318531	0	1	0	15	0
3	3	1	0	0	-6.28318531	0	1	0	1	0

									136	**0**

Para u=1; v=0

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0	-6.28318531	0	1	0	2	0
0	2	3	0	0	-6.28318531	0	1	0	3	0
0	3	13	0	0	-6.28318531	0	1	0	13	0
1	0	5	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	3.06287E-16	-5
1	1	11	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	6.73832E-16	-11
1	2	10	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	6.12574E-16	-10
1	3	8	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	4.90059E-16	-8
2	0	9	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-9	-1.10263E-15
2	1	7	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-7	-8.57604E-16
2	2	6	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-6	-7.35089E-16
2	3	12	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-12	-1.47018E-15
3	0	4	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-7.35089E-16	4
3	1	14	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-2.57281E-15	14
3	2	15	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-2.75658E-15	15
3	3	1	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-1.83772E-16	1
									- 0	**0**

Para u=2; v=0

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0	-6.28318531	0	1	0	2	0
0	2	3	0	0	-6.28318531	0	1	0	3	0
0	3	13	0	0	-6.28318531	0	1	0	13	0
1	0	5	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-5	-6.12574E-16
1	1	11	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-11	-1.34766E-15
1	2	10	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-10	-1.22515E-15
1	3	8	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-8	-9.80119E-16
2	0	9	1	0	-6.28318531	-6.28318531	1	2.4503E-16	9	2.20527E-15
2	1	7	1	0	-6.28318531	-6.28318531	1	2.4503E-16	7	1.71521E-15
2	2	6	1	0	-6.28318531	-6.28318531	1	2.4503E-16	6	1.47018E-15
2	3	12	1	0	-6.28318531	-6.28318531	1	2.4503E-16	12	2.94036E-15
3	0	4	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-4	-1.47018E-15
3	1	14	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-14	-5.14562E-15
3	2	15	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-15	-5.51317E-15
3	3	1	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-1	-3.67545E-16
									0	**- 0**

Para u=3; v=0

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0	-6.28318531	0	1	0	2	0
0	2	3	0	0	-6.28318531	0	1	0	3	0
0	3	13	0	0	-6.28318531	0	1	0	13	0
1	0	5	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-9.18861E-16	5

1	1	11	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-2.02149E-15	11
1	2	10	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-1.83772E-15	10
1	3	8	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-1.47018E-15	8
2	0	9	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-9	-3.3079E-15
2	1	7	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-7	-2.57281E-15
2	2	6	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-6	-2.20527E-15
2	3	12	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-12	-4.41053E-15
3	0	4	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	2.20527E-15	-4
3	1	14	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	7.71844E-15	-14
3	2	15	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	8.26975E-15	-15
3	3	1	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	5.51317E-16	-1
									0	**- 0**

Para u=0; v=1

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	1.22515E-16	-2
0	2	3	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-3	-3.67545E-16
0	3	13	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.38904E-15	13
1	0	5	0	0	-6.28318531	0	1	0	5	0
1	1	11	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	6.73832E-16	-11
1	2	10	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-10	-1.22515E-15
1	3	8	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-1.47018E-15	8
2	0	9	0	0	-6.28318531	0	1	0	9	0
2	1	7	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	4.28802E-16	-7
2	2	6	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-6	-7.35089E-16
2	3	12	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.20527E-15	12
3	0	4	0	0	-6.28318531	0	1	0	4	0
3	1	14	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	8.57604E-16	-14
3	2	15	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-15	-1.83772E-15
3	3	1	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-1.83772E-16	1
									- 0	**- 0**

Para u=1; v=1

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	1.22515E-16	-2
0	2	3	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-3	-3.67545E-16
0	3	13	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.38904E-15	13
1	0	5	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	3.06287E-16	-5
1	1	11	0.25	0.25	-6.28318531	-3.14159265	-1	-1.2251E-16	-11	-1.34766E-15
1	2	10	0.25	0.5	-6.28318531	-4.71238898	-1.8377E-16	1	-1.83772E-15	10
1	3	8	0.25	0.75	-6.28318531	-6.28318531	1	2.4503E-16	8	1.96024E-15
2	0	9	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-9	-1.10263E-15
2	1	7	0.5	0.25	-6.28318531	-4.71238898	-1.8377E-16	1	-1.28641E-15	7
2	2	6	0.5	0.5	-6.28318531	-6.28318531	1	2.4503E-16	6	1.47018E-15
2	3	12	0.5	0.75	-6.28318531	-7.85398163	3.0629E-16	-1	3.67545E-15	-12
3	0	4	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-7.35089E-16	4

3	1	14	0.75	0.25	-6.28318531	-6.28318531	1	2.4503E-16	14	3.43042E-15
3	2	15	0.75	0.5	-6.28318531	-7.85398163	3.0629E-16	-1	4.59431E-15	-15
3	3	1	0.75	0.75	-6.28318531	-9.42477796	-1	-3.6754E-16	-1	-3.67545E-16
									20	**0**

Para u=2; v=1

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	1.22515E-16	-2
0	2	3	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-3	-3.67545E-16
0	3	13	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.38904E-15	13
1	0	5	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-5	-6.12574E-16
1	1	11	0.5	0.25	-6.28318531	-4.71238898	-1.8377E-16	1	-2.02149E-15	11
1	2	10	0.5	0.5	-6.28318531	-6.28318531	1	2.4503E-16	10	2.4503E-15
1	3	8	0.5	0.75	-6.28318531	-7.85398163	3.0629E-16	-1	2.4503E-15	-8
2	0	9	1	0	-6.28318531	-6.28318531	1	2.4503E-16	9	2.20527E-15
2	1	7	1	0.25	-6.28318531	-7.85398163	3.0629E-16	-1	2.14401E-15	-7
2	2	6	1	0.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-6	-2.20527E-15
2	3	12	1	0.75	-6.28318531	-10.9955743	-4.288E-16	1	-5.14562E-15	12
3	0	4	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-4	-1.47018E-15
3	1	14	1.5	0.25	-6.28318531	-10.9955743	-4.288E-16	1	-6.00323E-15	14
3	2	15	1.5	0.5	-6.28318531	-12.5663706	1	4.9006E-16	15	7.35089E-15
3	3	1	1.5	0.75	-6.28318531	-14.1371669	5.5132E-16	-1	5.51317E-16	-1
									32	**32**

Para u=3; v=1

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.25	-6.28318531	-1.57079633	6.1257E-17	-1	1.22515E-16	-2
0	2	3	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-3	-3.67545E-16
0	3	13	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.38904E-15	13
1	0	5	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-9.18861E-16	5
1	1	11	0.75	0.25	-6.28318531	-6.28318531	1	2.4503E-16	11	2.69533E-15
1	2	10	0.75	0.5	-6.28318531	-7.85398163	3.0629E-16	-1	3.06287E-15	-10
1	3	8	0.75	0.75	-6.28318531	-9.42477796	-1	-3.6754E-16	-8	-2.94036E-15
2	0	9	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-9	-3.3079E-15
2	1	7	1.5	0.25	-6.28318531	-10.9955743	-4.288E-16	1	-3.00161E-15	7
2	2	6	1.5	0.5	-6.28318531	-12.5663706	1	4.9006E-16	6	2.94036E-15
2	3	12	1.5	0.75	-6.28318531	-14.1371669	5.5132E-16	-1	6.6158E-15	-12
3	0	4	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	2.20527E-15	-4
3	1	14	2.25	0.25	-6.28318531	-15.7079633	-1	-6.1257E-16	-14	-8.57604E-15
3	2	15	2.25	0.5	-6.28318531	-17.2787596	-2.4502E-15	1	-3.67528E-14	15
3	3	1	2.25	0.75	-6.28318531	-18.8495559	1	7.3509E-16	1	7.35089E-16
									- 0	**12**

Para u=0; v=2

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0

0	1	2	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-2	-2.4503E-16
0	2	3	0	1	-6.28318531	-6.28318531	1	2.4503E-16	3	7.35089E-16
0	3	13	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-13	-4.77808E-15
1	0	5	0	0	-6.28318531	0	1	0	5	0
1	1	11	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-11	-1.34766E-15
1	2	10	0	1	-6.28318531	-6.28318531	1	2.4503E-16	10	2.4503E-15
1	3	8	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-8	-2.94036E-15
2	0	9	0	0	-6.28318531	0	1	0	9	0
2	1	7	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-7	-8.57604E-16
2	2	6	0	1	-6.28318531	-6.28318531	1	2.4503E-16	6	1.47018E-15
2	3	12	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-12	-4.41053E-15
3	0	4	0	0	-6.28318531	0	1	0	4	0
3	1	14	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-14	-1.71521E-15
3	2	15	0	1	-6.28318531	-6.28318531	1	2.4503E-16	15	3.67545E-15
3	3	1	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-1	-3.67545E-16
									0	**- 0**

Para u=1; v=2

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-2	-2.4503E-16
0	2	3	0	1	-6.28318531	-6.28318531	1	2.4503E-16	3	7.35089E-16
0	3	13	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-13	-4.77808E-15
1	0	5	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	3.06287E-16	-5
1	1	11	0.25	0.5	-6.28318531	-4.71238898	-1.8377E-16	1	-2.02149E-15	11
1	2	10	0.25	1	-6.28318531	-7.85398163	3.0629E-16	-1	3.06287E-15	-10
1	3	8	0.25	1.5	-6.28318531	-10.9955743	-4.288E-16	1	-3.43042E-15	8
2	0	9	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-9	-1.10263E-15
2	1	7	0.5	0.5	-6.28318531	-6.28318531	1	2.4503E-16	7	1.71521E-15
2	2	6	0.5	1	-6.28318531	-9.42477796	-1	-3.6754E-16	-6	-2.20527E-15
2	3	12	0.5	1.5	-6.28318531	-12.5663706	1	4.9006E-16	12	5.88071E-15
3	0	4	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-7.35089E-16	4
3	1	14	0.75	0.5	-6.28318531	-7.85398163	3.0629E-16	-1	4.28802E-15	-14
3	2	15	0.75	1	-6.28318531	-10.9955743	-4.288E-16	1	-6.43203E-15	15
3	3	1	0.75	1.5	-6.28318531	-14.1371669	5.5132E-16	-1	5.51317E-16	-1
									8	**8**

Para u=2; v=2

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-2	-2.4503E-16
0	2	3	0	1	-6.28318531	-6.28318531	1	2.4503E-16	3	7.35089E-16
0	3	13	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-13	-4.77808E-15
1	0	5	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-5	-6.12574E-16
1	1	11	0.5	0.5	-6.28318531	-6.28318531	1	2.4503E-16	11	2.69533E-15
1	2	10	0.5	1	-6.28318531	-9.42477796	-1	-3.6754E-16	-10	-3.67545E-15
1	3	8	0.5	1.5	-6.28318531	-12.5663706	1	4.9006E-16	8	3.92048E-15
2	0	9	1	0	-6.28318531	-6.28318531	1	2.4503E-16	9	2.20527E-15

2	1	7	1	0.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-7	-2.57281E-15
2	2	6	1	1	-6.28318531	-12.5663706	1	4.9006E-16	6	2.94036E-15
2	3	12	1	1.5	-6.28318531	-15.7079633	-1	-6.1257E-16	-12	-7.35089E-15
3	0	4	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-4	-1.47018E-15
3	1	14	1.5	0.5	-6.28318531	-12.5663706	1	4.9006E-16	14	6.86083E-15
3	2	15	1.5	1	-6.28318531	-15.7079633	-1	-6.1257E-16	-15	-9.18861E-15
3	3	1	1.5	1.5	-6.28318531	-18.8495559	1	7.3509E-16	1	7.35089E-16
									0	**- 0**

Para u=3; v=2

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.5	-6.28318531	-3.14159265	-1	-1.2251E-16	-2	-2.4503E-16
0	2	3	0	1	-6.28318531	-6.28318531	1	2.4503E-16	3	7.35089E-16
0	3	13	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-13	-4.77808E-15
1	0	5	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-9.18861E-16	5
1	1	11	0.75	0.5	-6.28318531	-7.85398163	3.0629E-16	-1	3.36916E-15	-11
1	2	10	0.75	1	-6.28318531	-10.9955743	-4.288E-16	1	-4.28802E-15	10
1	3	8	0.75	1.5	-6.28318531	-14.1371669	5.5132E-16	-1	4.41053E-15	-8
2	0	9	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-9	-3.3079E-15
2	1	7	1.5	0.5	-6.28318531	-12.5663706	1	4.9006E-16	7	3.43042E-15
2	2	6	1.5	1	-6.28318531	-15.7079633	-1	-6.1257E-16	-6	-3.67545E-15
2	3	12	1.5	1.5	-6.28318531	-18.8495559	1	7.3509E-16	12	8.82107E-15
3	0	4	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	2.20527E-15	-4
3	1	14	2.25	0.5	-6.28318531	-17.2787596	-2.4502E-15	1	-3.43026E-14	14
3	2	15	2.25	1	-6.28318531	-20.4203522	-9.8001E-16	-1	-1.47002E-14	-15
3	3	1	2.25	1.5	-6.28318531	-23.5619449	-2.6952E-15	1	-2.69522E-15	1
									8	**- 8**

Para u=0; v=3

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-3.67545E-16	2
0	2	3	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-3	-1.10263E-15
0	3	13	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	7.16712E-15	-13
1	0	5	0	0	-6.28318531	0	1	0	5	0
1	1	11	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.02149E-15	11
1	2	10	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-10	-3.67545E-15
1	3	8	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	4.41053E-15	-8
2	0	9	0	0	-6.28318531	0	1	0	9	0
2	1	7	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-1.28641E-15	7
2	2	6	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-6	-2.20527E-15
2	3	12	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	6.6158E-15	-12
3	0	4	0	0	-6.28318531	0	1	0	4	0
3	1	14	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-2.57281E-15	14
3	2	15	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-15	-5.51317E-15
3	3	1	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	5.51317E-16	-1
									0	**0**

Para u=1; v=3

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-3.67545E-16	2
0	2	3	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-3	-1.10263E-15
0	3	13	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	7.16712E-15	-13
1	0	5	0.25	0	-6.28318531	-1.57079633	6.1257E-17	-1	3.06287E-16	-5
1	1	11	0.25	0.75	-6.28318531	-6.28318531	1	2.4503E-16	11	2.69533E-15
1	2	10	0.25	1.5	-6.28318531	-10.9955743	-4.288E-16	1	-4.28802E-15	10
1	3	8	0.25	2.25	-6.28318531	-15.7079633	-1	-6.1257E-16	-8	-4.90059E-15
2	0	9	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-9	-1.10263E-15
2	1	7	0.5	0.75	-6.28318531	-7.85398163	3.0629E-16	-1	2.14401E-15	-7
2	2	6	0.5	1.5	-6.28318531	-12.5663706	1	4.9006E-16	6	2.94036E-15
2	3	12	0.5	2.25	-6.28318531	-17.2787596	-2.4502E-15	1	-2.94023E-14	12
3	0	4	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-7.35089E-16	4
3	1	14	0.75	0.75	-6.28318531	-9.42477796	-1	-3.6754E-16	-14	-5.14562E-15
3	2	15	0.75	1.5	-6.28318531	-14.1371669	5.5132E-16	-1	8.26975E-15	-15
3	3	1	0.75	2.25	-6.28318531	-18.8495559	1	7.3509E-16	1	7.35089E-16
									- 0	**- 12**

Para u=2; v=3

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-3.67545E-16	2
0	2	3	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-3	-1.10263E-15
0	3	13	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	7.16712E-15	-13
1	0	5	0.5	0	-6.28318531	-3.14159265	-1	-1.2251E-16	-5	-6.12574E-16
1	1	11	0.5	0.75	-6.28318531	-7.85398163	3.0629E-16	-1	3.36916E-15	-11
1	2	10	0.5	1.5	-6.28318531	-12.5663706	1	4.9006E-16	10	4.90059E-15
1	3	8	0.5	2.25	-6.28318531	-17.2787596	-2.4502E-15	1	-1.96015E-14	8
2	0	9	1	0	-6.28318531	-6.28318531	1	2.4503E-16	9	2.20527E-15
2	1	7	1	0.75	-6.28318531	-10.9955743	-4.288E-16	1	-3.00161E-15	7
2	2	6	1	1.5	-6.28318531	-15.7079633	-1	-6.1257E-16	-6	-3.67545E-15
2	3	12	1	2.25	-6.28318531	-20.4203522	-9.8001E-16	-1	-1.17601E-14	-12
3	0	4	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-4	-1.47018E-15
3	1	14	1.5	0.75	-6.28318531	-14.1371669	5.5132E-16	-1	7.71844E-15	-14
3	2	15	1.5	1.5	-6.28318531	-18.8495559	1	7.3509E-16	15	1.10263E-14
3	3	1	1.5	2.25	-6.28318531	-23.5619449	-2.6952E-15	1	-2.69522E-15	1
									32	**- 32**

Para u=3; v=3

x	y	f(x,y)	A=(x*u)/m	B=(y*v)/n	2π	2π(A+B)	Cos(2π(A+B))	jsen(2π(A+B))	f(x,y) X cos	f(x,y) X sen
0	0	16	0	0	-6.28318531	0	1	0	16	0
0	1	2	0	0.75	-6.28318531	-4.71238898	-1.8377E-16	1	-3.67545E-16	2
0	2	3	0	1.5	-6.28318531	-9.42477796	-1	-3.6754E-16	-3	-1.10263E-15
0	3	13	0	2.25	-6.28318531	-14.1371669	5.5132E-16	-1	7.16712E-15	-13
1	0	5	0.75	0	-6.28318531	-4.71238898	-1.8377E-16	1	-9.18861E-16	5
1	1	11	0.75	0.75	-6.28318531	-9.42477796	-1	-3.6754E-16	-11	-4.04299E-15

1	2	10	0.75	1.5	-6.28318531	-14.1371669	5.5132E-16	-1	5.51317E-15	-10
1	3	8	0.75	2.25	-6.28318531	-18.8495559	1	7.3509E-16	8	5.88071E-15
2	0	9	1.5	0	-6.28318531	-9.42477796	-1	-3.6754E-16	-9	-3.3079E-15
2	1	7	1.5	0.75	-6.28318531	-14.1371669	5.5132E-16	-1	3.85922E-15	-7
2	2	6	1.5	1.5	-6.28318531	-18.8495559	1	7.3509E-16	6	4.41053E-15
2	3	12	1.5	2.25	-6.28318531	-23.5619449	-2.6952E-15	1	-3.23426E-14	12
3	0	4	2.25	0	-6.28318531	-14.1371669	5.5132E-16	-1	2.20527E-15	-4
3	1	14	2.25	0.75	-6.28318531	-18.8495559	1	7.3509E-16	14	1.02912E-14
3	2	15	2.25	1.5	-6.28318531	-23.5619449	-2.6952E-15	1	-4.04283E-14	15
3	3	1	2.25	2.25	-6.28318531	-28.2743339	-1	-1.1026E-15	-1	-1.10263E-15
									20	**0**

Resultado

136	0	0	0
0	20	8+8i	-12i
0	32+32i	0	32-32i
0	12i	8-8i	20

Real

136	0	0	0
0	20	8	0
0	32	0	32
0	0	8	20

Imaginaria

0	0	0	0
0	0	8i	-12i
0	32i	0	-32i
0	12i	-8i	0

En MATLAB (fft2)

F=[16 2 3 13; 5 11 10 8; 9 7 6 12; 4 14 15 1]

F =

```
   16    2    3   13
    5   11   10    8
    9    7    6   12
```

4 14 15 1

G=fft2(F)

G =

1.0e+002 *

1.3600	0	0	0
0	0.2000	0.0800 + 0.0800i	0 - 0.1200i
0	0.3200 + 0.3200i	0	0.3200 - 0.3200i
0	0 + 0.1200i	0.0800 - 0.0800i	0.2000

Trasladar el origen de la imagen al centro geométrico de la transformada (fftshift)

G2 = fftshift(G)

1.0e+002 *

0	0.3200 - 0.3200i	0	0.3200 + 0.3200i
0.0800 - 0.0800i	0.2000	0	0 + 0.1200i
0	0	1.3600	0
0.0800 + 0.0800i	0 - 0.1200i	0	0.2000

0	32–32i	0	32+32i
8-8i	2	0	12i
0	0	136	0
8+8i	-12i	0	20

Real

0	32	0	32
8	2	0	0
0	0	136	0
8	0	0	20

Imaginaria

0	–32i	0	32i
-8i	0	0	12i
0	0	0	0
8i	-12i	0	0