

```
> restart:with(linalg):
```

```
Warning, the protected names norm and trace have been redefined and unprotected
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```
> gx:=(2+4+5+6+7)/5;gy:=(3+4+4+4+8)/5;
```

$$gx := \frac{24}{5}$$

$$gy := \frac{23}{5}$$

```
> p1xp:=2-gx;p2xp:=4-gx;p3xp:=5-gx;p4xp:=6-gx;p5xp:=7-gx;p1yp:=3-gy;
p2yp:=4-gy;p3yp:=4-gy;p4yp:=4-gy;p5yp:=8-gy;
```

$$p1xp := \frac{-14}{5}$$

$$p2xp := \frac{-4}{5}$$

$$p3xp := \frac{1}{5}$$

$$p4xp := \frac{6}{5}$$

$$p5xp := \frac{11}{5}$$

$$p1yp := \frac{-8}{5}$$

$$p2yp := \frac{-3}{5}$$

$$p3yp := \frac{-3}{5}$$

$$p4yp := \frac{-3}{5}$$

$$p5yp := \frac{17}{5}$$

```
> Ixx:=p1yp^2+p2yp^2+p3yp^2+p4yp^2+p5yp^2;Iyy:=p1xp^2+p2xp^2+p3xp^2+
p4xp^2+p5xp^2;Ixy:=p1xp*p1yp+p2xp*p2yp+p3xp*p3yp+p4xp*p4yp+p5xp*p5
yp;
```

$$Ixx := \frac{76}{5}$$

$$Iyy := \frac{74}{5}$$

$$I_{xy} := \frac{58}{5}$$

```
> evm:=matrix(2,2,[Ixx-lambda,-Ixy,-Ixy,Iyy-lambda]);
```

$$evm := \begin{bmatrix} \frac{76}{5} - \lambda & -\frac{58}{5} \\ -\frac{58}{5} & \frac{74}{5} - \lambda \end{bmatrix}$$

```
> ceq:=det(evm);
```

$$ceq := \frac{452}{5} - 30\lambda + \lambda^2$$

```
> evls:=[solve(ceq)];
```

$$evls := \left[15 + \frac{1}{5}\sqrt{3365}, 15 - \frac{1}{5}\sqrt{3365} \right]$$

```
> evc1:=((76/5)-evls[1])*ex-(58/5)*ey;ey:=solve(evc1,ey);
```

$$evc1 := \left(\frac{1}{5} - \frac{1}{5}\sqrt{3365} \right) ex - \frac{58}{5} ey$$

$$ey := \frac{1}{58} ex - \frac{1}{58} ex \sqrt{3365}$$

```
> evc2:=((76/5)-evls[2])*fx-(58/5)*fy;fy:=solve(evc2,fy);
```

$$evc2 := \left(\frac{1}{5} + \frac{1}{5}\sqrt{3365} \right) fx - \frac{58}{5} fy$$

$$fy := \frac{1}{58} fx + \frac{1}{58} fx \sqrt{3365}$$

```
> ex:=1:evalf(ey);fx:=1:evalf(fy);
```

-9829072427

1.017390001

```
> crcf:=evls[2]/evls[1];evalf(crcf);evalf(sqrt(crcf));
```

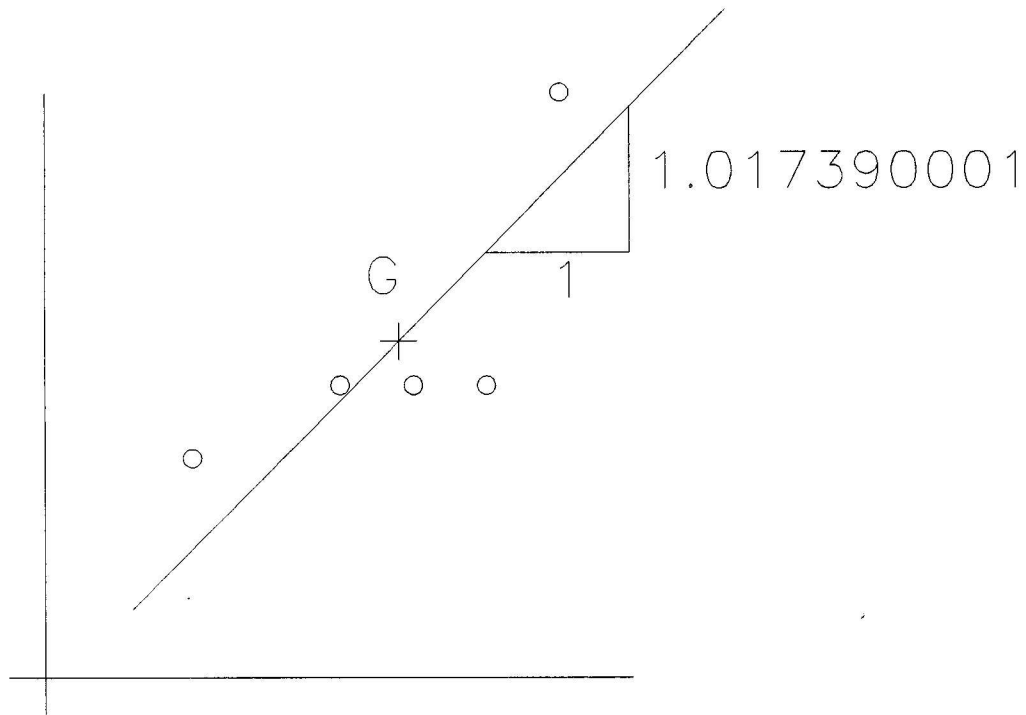
$$crcf := \frac{15 - \frac{1}{5}\sqrt{3365}}{15 + \frac{1}{5}\sqrt{3365}}$$

.1277464569

.3574163635

Notice that the square root of the ratio min:max eigenvalue is heading towards 1, almost half-way there. min:max=1 is what we'd get with a) a lot of points arranged in an exact circular pattern or b) a splatter of points that was symmetrical about the centre of the pattern. We may conclude that these 5 given points 1P(2,3),2P(4,4),3P(5,4),4P(6,4),5P(7,8) are not well correlated to a straight line fit.

(29)CrCf431.mws, 04-03-12



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