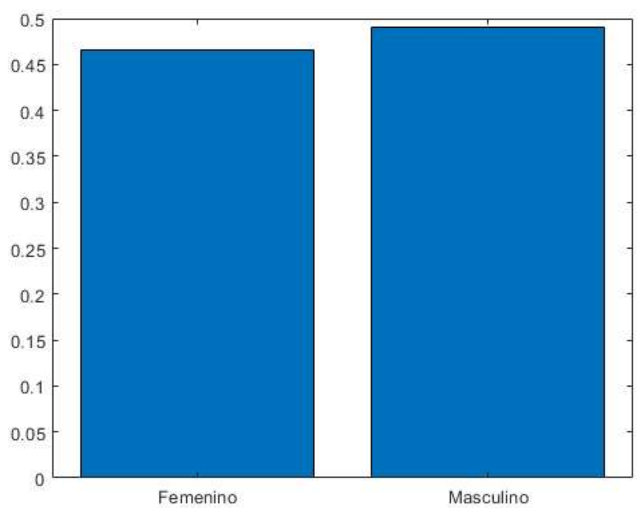
CIFI V. Problema: Digitt. Materia: Metodos de Inteligencia Artificial

Cargamos datos

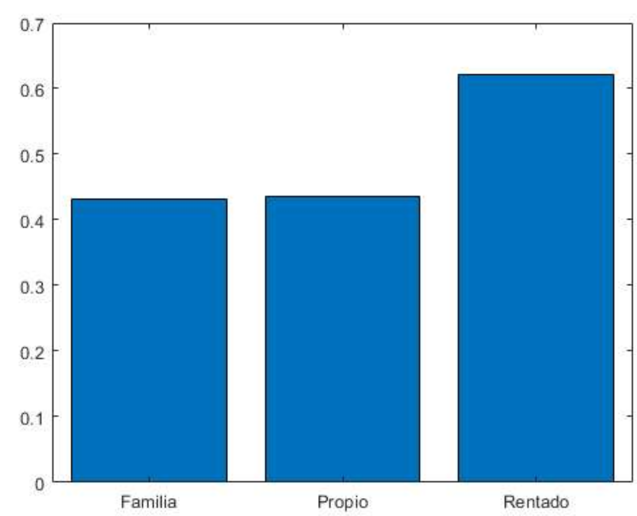
```
load Digitt.mat
data
```

```
data = 20×927

    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000   ···
   -0.5972   -0.1960    0.9629    0.4280    0.3834   -0.5393    0.6063   -0.5972    0.6063   -0.6774   -0.3298   -0.5749   -0.1069
   -0.4493   -0.4493   -0.1167   -1.2254   -1.2254   -0.3385   -1.1146    0.1050   -0.6711   -0.7820   -0.8928   -0.5602    0.6594
   -0.4467    1.6226   -1.2666   -1.4618   -1.4618   -0.9152   -1.4227   -0.4076    0.6856   -1.5399   -0.5247    0.2952   -1.6570
    0.1195   -0.5555    0.2113    0.1750    0.1750   -0.5427   -0.4590   -0.1339   -0.2429   -0.5337   -0.4428    0.0300   -0.1330
    0.2998   -0.5234    1.6626    0.4220    0.4220   -0.5083   -0.3999    0.0055   -0.1155   -0.4941   -0.3960    0.2168    0.0112
    1.6313    1.6313   -0.6123   -0.6123   -0.6123   -0.6123   -0.6123   -0.6123   -0.6123   -0.6123   -0.6123    1.6313    1.6313
   -1.6313   -1.6313    0.6123    0.6123    0.6123    0.6123    0.6123    0.6123    0.6123    0.6123    0.6123   -1.6313   -1.6313
    1.6051   -0.6223    1.6051   -0.6223   -0.6223    1.6051   -0.6223   -0.6223   -0.6223    1.6051   -0.6223    1.6051   -0.6223
   -0.8442   -0.8442   -0.8442    1.1832    1.1832   -0.8442    1.1832    1.1832   -0.8442   -0.8442    1.1832   -0.8442    1.1832
      ⋮
```

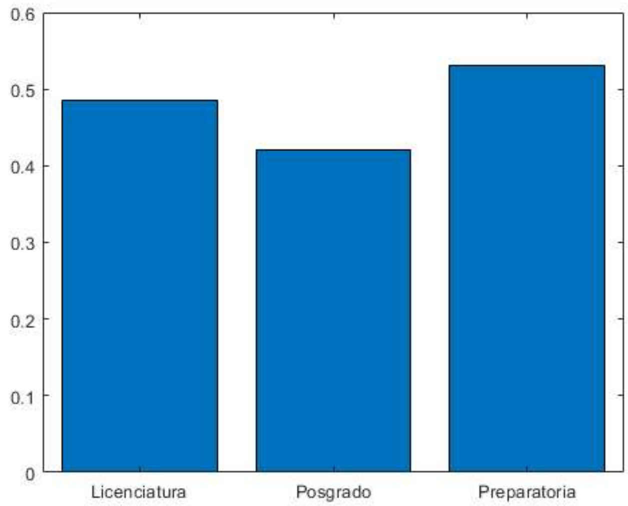
```
bar(categorical({'Femenino','Masculino'}),sum(gender(Y==1,:),1)./sum(gender(:,:),1))
```



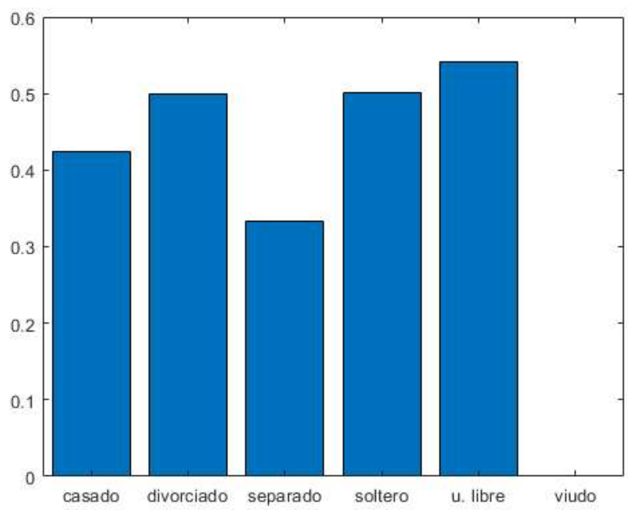

```
bar(categorical({'Familia','Propio','Rentado'}),sum(housing_type(Y==1,:),1)./sum(housing_type(:,:),1))
```




```
bar(categorical({'Licenciatura','Posgrado','Preparatoria'}),sum(level_of_studies(Y==1,:),1)./sum(level_of_studies(:,:),1))
```

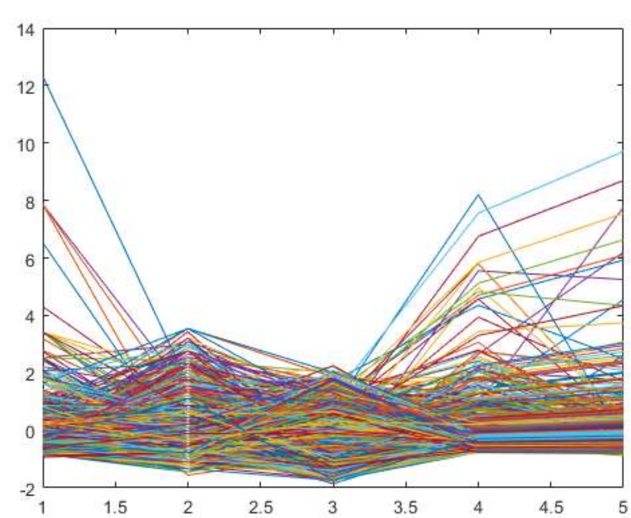



```
bar(categorical({'casado','divorciado' ,'separado' ,'soltero', 'u. libre','viudo'}),sum(marital_status(Y==1,:),1)./sum(marital_status(:,:
```



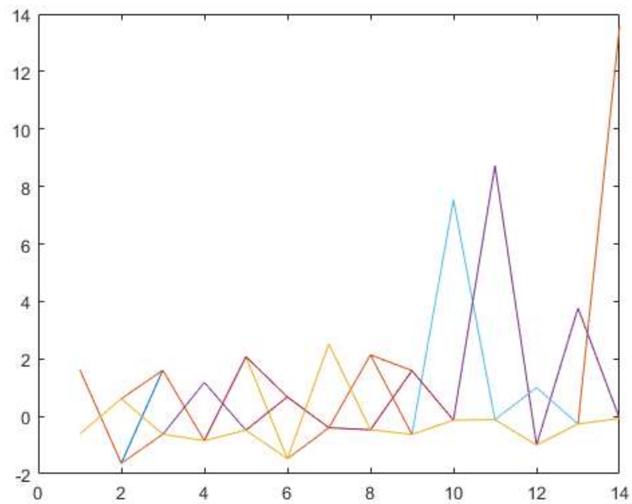
Los datos y su estructura (datos ya estandarizados)

```
% income age score total_debt amount_to_be_lend
plot(X1')
```

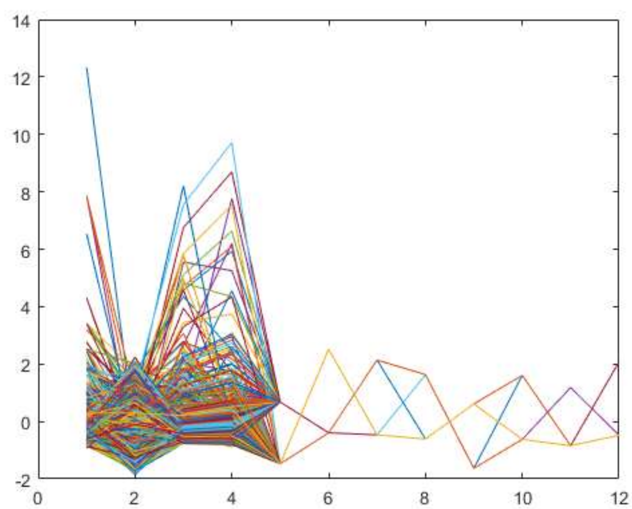



```
% gender housing_type level_of_studies marital_status
```

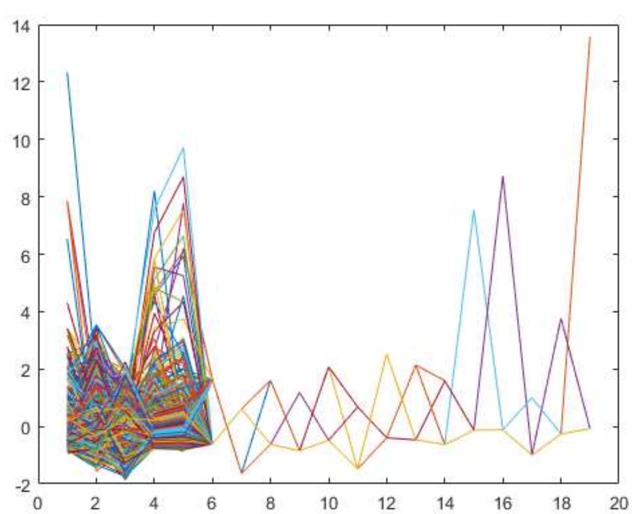
```
plot(X2')
```



```
% income score total_debt amount_to_be_lend level_of_studies gender housing_type
plot(X3')
```



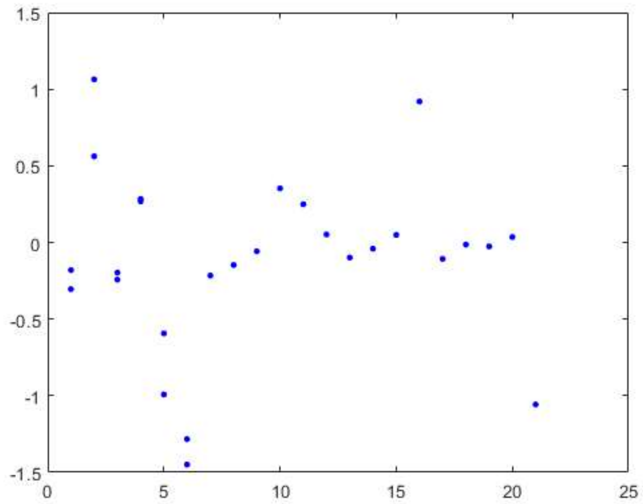
```
% income age score total_debt amount_to_be_lend gender housing_type level_of_studies marital_status
plot(X4')
```



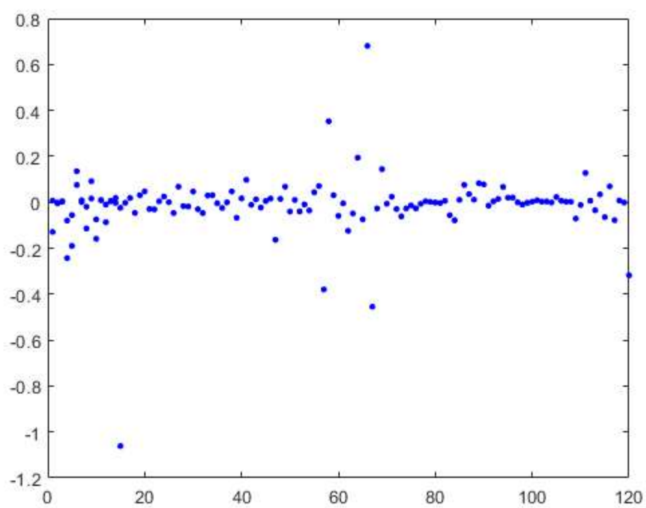
```

```

Importancia de los pesos del perceptron

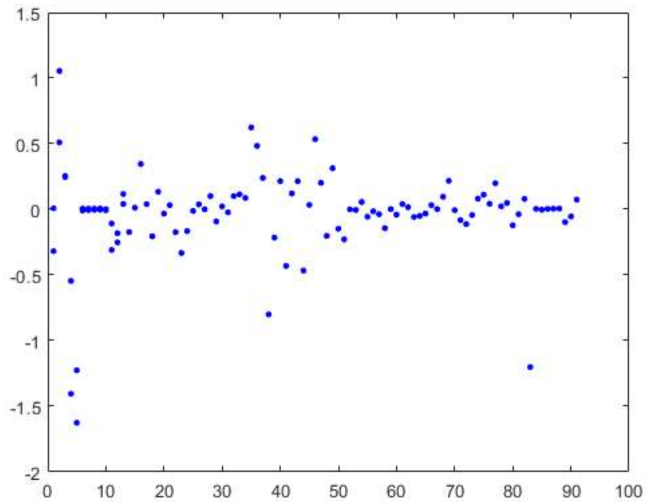
```
% income age score total_debt amount_to_be_lend
for k=1:2
    eval(sprintf('plot(Wperceptron.m%dg%d,''b.'',''MarkerSize'',10)',1,k));
    hold on
end
hold off
```



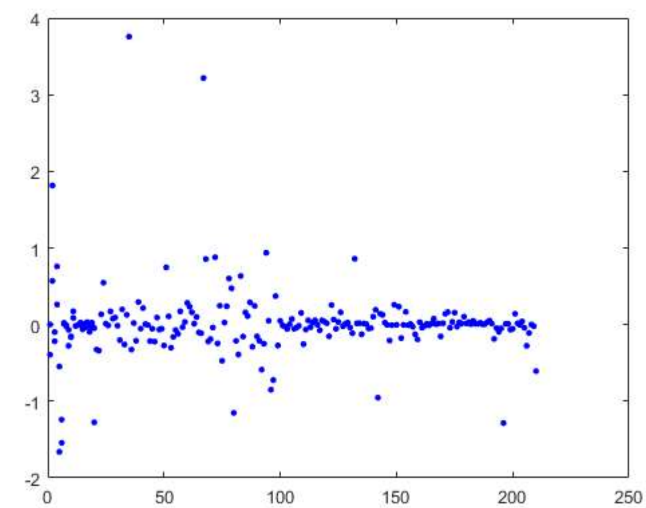
```
% gender housing_type level_of_studies marital_status
for k=1:2
    eval(sprintf('plot(Wperceptron.m%dg%d,''b.'',''MarkerSize'',10)',2,k));
    hold on
end
hold off
```



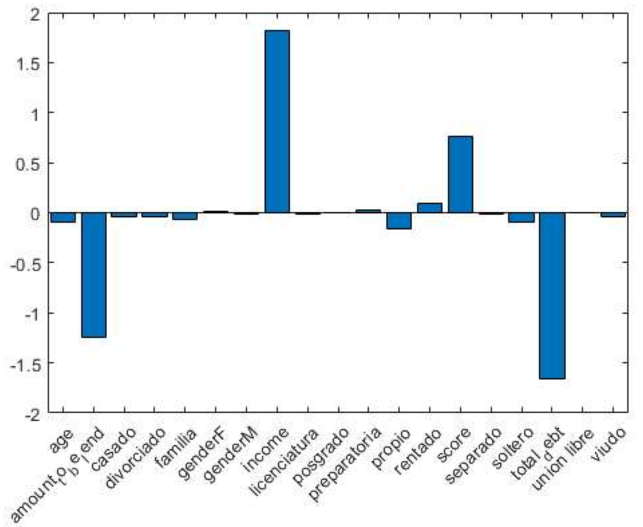
```
% income score total_debt amount_to_be_lend level_of_studies gender housing_type
for k=1:2
    eval(sprintf('plot(Wperceptron.m%dg%d,''b.'',''MarkerSize'',10)',3,k));
    hold on
end
hold off
```




```
% income age score total_debt amount_to_be_lend gender housing_type level_of_studies marital_status
for k=1:2
    eval(sprintf('plot(Wperceptron.m%dg%d,''b.'',''MarkerSize'',10)',4,k));
    hold on
end
hold off
```




```
ygraph=Wperceptron.m4g2(2:20);
xgraph=categorical({'income' 'age' 'score' 'total_debt' 'amount_to_be_lend' 'genderF' 'genderM' 'familia' 'propio' 'rentado'  'licenciatu
bar(xgraph,ygraph)
```



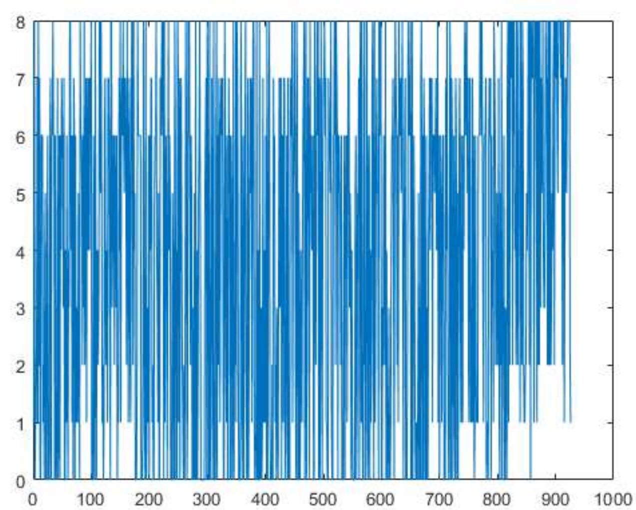
Desempeño de los modelos

```
Desempenio
```

```
Desempenio = struct with fields:
    m1g1: [0.6882 0.7394 0.6587]
    m2g1: [0.5771 0.3808 0.6000]
    m3g1: [0.6926 0.7283 0.6673]
    m4g1: [0.6936 0.7372 0.6660]
    m1g2: [0.7033 0.7728 0.6673]
    m2g2: [0.6052 0.5367 0.6040]
    m3g2: [0.7141 0.7528 0.6870]
    m4g2: [0.7627 0.7884 0.7390]
```

Estimados (Predicciones)

```
YgGlobal = zeros(size(Y));
for k=1:2
    for i=1:4
        eval(sprintf('YgGlobal = YgGlobal + Yg.m%dg%d;',i,k));
    end
end
plot(YgGlobal)
```



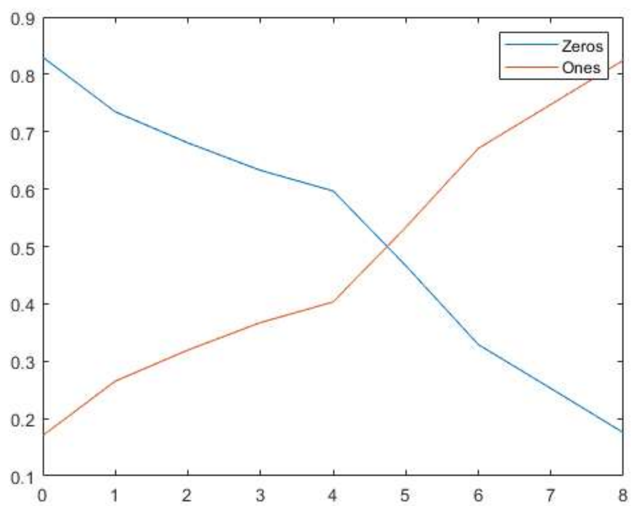
Porcentaje de aciertos en 1's y 0's para predicciones comunes entre los modelos

```
zeros_ = zeros(9,1);
ones_ = zeros(9,1);
YgG = YgGlobal
```

```
YgG = 927×1
```

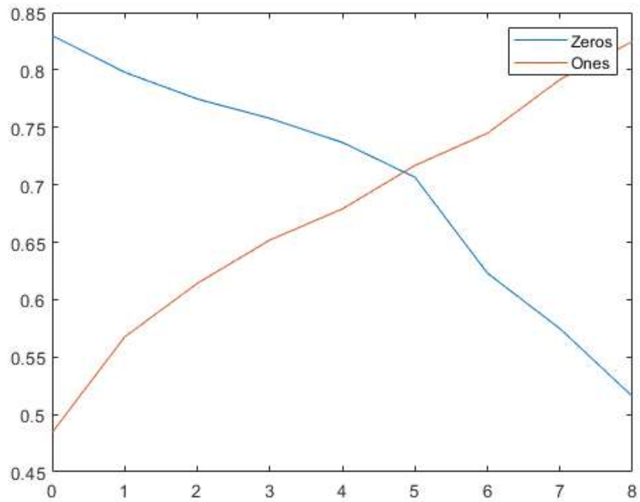
```
1
8
0
1
1
3
7
1
8
2
⋮
```

```
for i=1:9
    tmp00 = sum(~(YgG(YgG==i-1)==i-1)-Y(YgG==i-1));
    tmp01 = sum((YgG(YgG==i-1)==i-1));
    zeros_(i) = 1 + tmp00/tmp01; % 1 - error en los predichos

    tmp10 = sum((YgG(YgG==i-1)==i-1)-Y(YgG==i-1));
    tmp11 = sum(YgG(YgG==i-1)==i-1);
    ones_(i) = 1- tmp10/tmp11; % 1 - error en los predichos
end
plot([0:8],zeros_)
hold on
plot([0:8],ones_)
hold off
legend('Zeros','Ones')
```



Porcentaje de aciertos acumulativos en 1's y 0's para predicciones comunes entre los modelos

```
zeros_ = zeros(9,1);
ones_ = zeros(9,1);
for i=1:9
    tmp00 = sum(~(YgG(YgG<i)<i)-Y(YgG<i));
    tmp01 = sum((YgG(YgG<i)<i));
    zeros_(i) = 1 + tmp00/tmp01; % 1 - error en los predichos

    tmp10 = sum((YgG(YgG>=i-1)>=i-1)-Y(YgG>=i-1));
    tmp11 = sum(YgG(YgG>=i-1)>=i-1);
    ones_(i) = 1- tmp10/tmp11; % 1 - error en los predichos
end
plot([0:8],zeros_)
hold on
plot([0:8],ones_)
hold off
legend('Zeros','Ones')
```




```
mean([income age score total_debt amount_to_be_lend],1)
```

ans = 1×5

10^4 ×

```
    2.3398    0.0033    0.0669    4.8371    4.0563
```

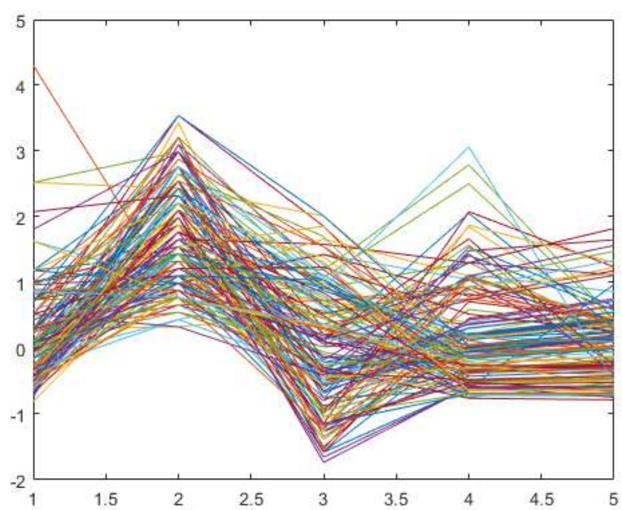
```
std([income age score total_debt amount_to_be_lend],1)
```

ans = 1×5

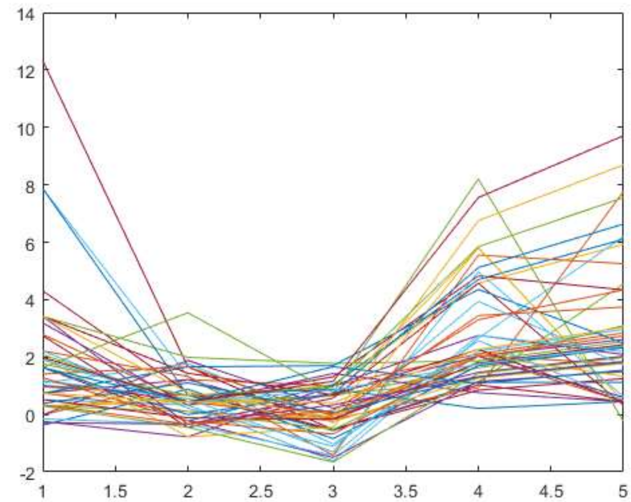
10^4 ×

```
    2.2423    0.0009    0.0026    5.5007    4.3614
```

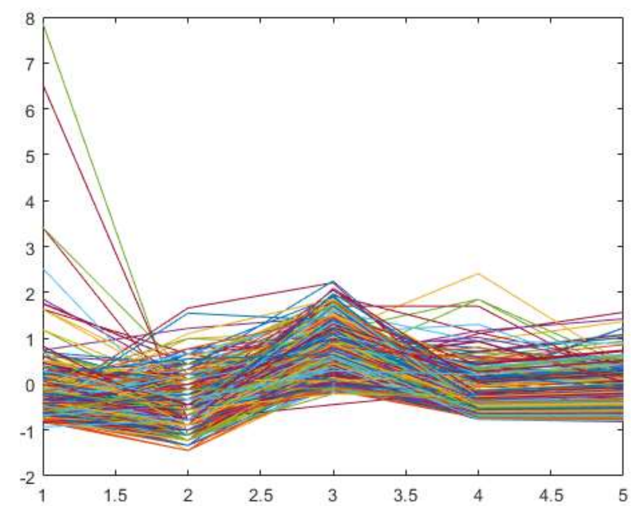
```
Yg_ = vec2ind(Red.m1.n65(X.m1g1'));
Un = unique(Yg_);
plot(X.m1g1(Yg_==Un(1),2:end)')
```



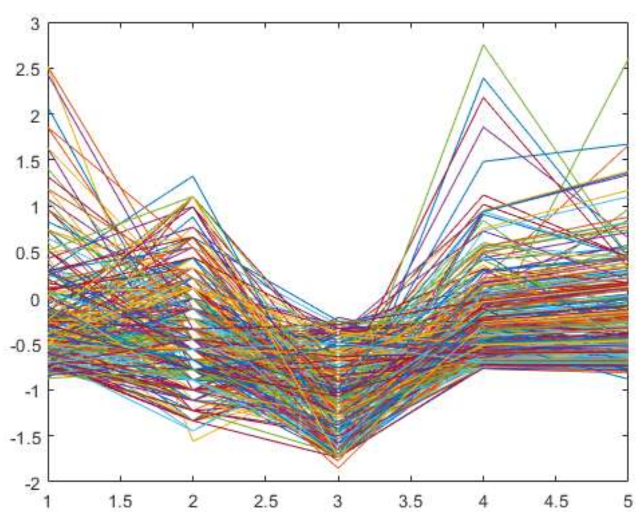
```
plot(X.m1g1(Yg_==Un(2),2:end)')
```




```
plot(X.m1g1(Yg_==Un(3),2:end)')
```




```
plot(X.m1g1(Yg_==Un(4),2:end)')
```




```
% plot(X.m1g1(Yg_==Un(5),2:end)')
% plot(X.m1g1(Yg_==Un(6),2:end)')
% plot(X.m1g1(Yg_==Un(7),2:end)')
% plot(X.m1g1(Yg_==Un(8),2:end)')
% plot(X.m1g1(Yg_==Un(9),2:end)')
```

```
% plot(X.m1g1(Yg_==Un(10),2:end)')
% plot(X.m1g1(Yg_==Un(11),2:end)')
% plot(X.m1g1(Yg_==Un(12),2:end)')
```