

### The DISCRIM Procedure

|                          |     |                           |     |
|--------------------------|-----|---------------------------|-----|
| <b>Total Sample Size</b> | 455 | <b>DF Total</b>           | 454 |
| <b>Variables</b>         | 10  | <b>DF Within Classes</b>  | 453 |
| <b>Classes</b>           | 2   | <b>DF Between Classes</b> | 1   |

|                                    |     |
|------------------------------------|-----|
| <b>Number of Observations Read</b> | 455 |
| <b>Number of Observations Used</b> | 455 |

| Class Level Information |                      |                  |               |                   |                          |
|-------------------------|----------------------|------------------|---------------|-------------------|--------------------------|
| <b>diagnosis</b>        | <b>Variable Name</b> | <b>Frequency</b> | <b>Weight</b> | <b>Proportion</b> | <b>Prior Probability</b> |
| <b>0</b>                | 0                    | 284              | 284.0000      | 0.624176          | 0.500000                 |
| <b>1</b>                | 1                    | 171              | 171.0000      | 0.375824          | 0.500000                 |

**The DISCRIM Procedure**  
**Within-Class SSCP Matrices**

| diagnosis = 0     |           |           |            |             |            |             |           |
|-------------------|-----------|-----------|------------|-------------|------------|-------------|-----------|
| Variable          | radius    | texture   | perimeter  | area        | smoothness | compactness | concavity |
| radius            | 871.396   | -122.397  | 5734.480   | 65925.626   | -0.791     | 0.822       | 1.060     |
| texture           | -122.397  | 4409.430  | -861.359   | -9997.614   | -3.285     | -2.490      | -2.853    |
| perimeter         | 5734.480  | -861.359  | 37950.539  | 433625.842  | -3.638     | 12.757      | 14.320    |
| area              | 65925.626 | -9997.614 | 433625.842 | 5037200.067 | -68.573    | 54.106      | 87.489    |
| smoothness        | -0.791    | -3.285    | -3.638     | -68.573     | 0.045      | 0.065       | 0.041     |
| compactness       | 0.822     | -2.490    | 12.757     | 54.106      | 0.065      | 0.280       | 0.270     |
| concavity         | 1.060     | -2.853    | 14.320     | 87.489      | 0.041      | 0.270       | 0.444     |
| concave_points    | 3.027     | -2.875    | 22.471     | 228.500     | 0.028      | 0.100       | 0.122     |
| symmetry          | -2.268    | -0.355    | -12.603    | -176.125    | 0.038      | 0.091       | 0.096     |
| fractal_dimension | -1.718    | -0.571    | -10.247    | -128.903    | 0.012      | 0.040       | 0.042     |

| diagnosis = 0     |                |          |                   |
|-------------------|----------------|----------|-------------------|
| Variable          | concave_points | symmetry | fractal_dimension |
| radius            | 3.027          | -2.268   | -1.718            |
| texture           | -2.875         | -0.355   | -0.571            |
| perimeter         | 22.471         | -12.603  | -10.247           |
| area              | 228.500        | -176.125 | -128.903          |
| smoothness        | 0.028          | 0.038    | 0.012             |
| compactness       | 0.100          | 0.091    | 0.040             |
| concavity         | 0.122          | 0.096    | 0.042             |
| concave_points    | 0.064          | 0.034    | 0.009             |
| symmetry          | 0.034          | 0.172    | 0.018             |
| fractal_dimension | 0.009          | 0.018    | 0.012             |

**The DISCRIM Procedure**  
**Within-Class SSCP Matrices**

| diagnosis = 1     |           |          |            |             |            |             |           |
|-------------------|-----------|----------|------------|-------------|------------|-------------|-----------|
| Variable          | radius    | texture  | perimeter  | area        | smoothness | compactness | concavity |
| radius            | 1746.19   | 216.84   | 11880.59   | 196851.07   | -0.72      | 4.95        | 21.10     |
| texture           | 216.84    | 2540.16  | 1526.74    | 24803.91    | -1.56      | 0.26        | 1.86      |
| perimeter         | 11880.59  | 1526.74  | 81665.84   | 1341872.12  | -1.88      | 52.74       | 165.96    |
| area              | 196851.07 | 24803.91 | 1341872.12 | 22688565.89 | -59.45     | 555.92      | 2456.09   |
| smoothness        | -0.72     | -1.56    | -1.88      | -59.45      | 0.03       | 0.08        | 0.11      |
| compactness       | 4.95      | 0.26     | 52.74      | 555.92      | 0.08       | 0.53        | 0.63      |
| concavity         | 21.10     | 1.86     | 165.96     | 2456.09     | 0.11       | 0.63        | 1.04      |
| concave_points    | 12.82     | -0.43    | 95.04      | 1460.89     | 0.04       | 0.24        | 0.42      |
| symmetry          | -0.88     | -2.60    | 0.89       | -107.03     | 0.04       | 0.19        | 0.20      |
| fractal_dimension | -1.72     | -0.46    | -9.47      | -187.30     | 0.01       | 0.06        | 0.05      |

| diagnosis = 1     |                |          |                   |
|-------------------|----------------|----------|-------------------|
| Variable          | concave_points | symmetry | fractal_dimension |
| radius            | 12.82          | -0.88    | -1.72             |
| texture           | -0.43          | -2.60    | -0.46             |
| perimeter         | 95.04          | 0.89     | -9.47             |
| area              | 1460.89        | -107.03  | -187.30           |
| smoothness        | 0.04           | 0.04     | 0.01              |
| compactness       | 0.24           | 0.19     | 0.06              |
| concavity         | 0.42           | 0.20     | 0.05              |
| concave_points    | 0.21           | 0.08     | 0.01              |
| symmetry          | 0.08           | 0.14     | 0.02              |
| fractal_dimension | 0.01           | 0.02     | 0.01              |

### The DISCRIM Procedure

| Pooled Within-Class SSCP Matrix |           |          |            |             |            |             |           |
|---------------------------------|-----------|----------|------------|-------------|------------|-------------|-----------|
| Variable                        | radius    | texture  | perimeter  | area        | smoothness | compactness | concavity |
| radius                          | 2617.58   | 94.44    | 17615.07   | 262776.70   | -1.52      | 5.77        | 22.16     |
| texture                         | 94.44     | 6949.59  | 665.39     | 14806.29    | -4.84      | -2.23       | -0.99     |
| perimeter                       | 17615.07  | 665.39   | 119616.38  | 1775497.97  | -5.52      | 65.50       | 180.28    |
| area                            | 262776.70 | 14806.29 | 1775497.97 | 27725765.96 | -128.03    | 610.02      | 2543.58   |
| smoothness                      | -1.52     | -4.84    | -5.52      | -128.03     | 0.07       | 0.15        | 0.15      |
| compactness                     | 5.77      | -2.23    | 65.50      | 610.02      | 0.15       | 0.81        | 0.90      |
| concavity                       | 22.16     | -0.99    | 180.28     | 2543.58     | 0.15       | 0.90        | 1.48      |
| concave_points                  | 15.85     | -3.30    | 117.51     | 1689.39     | 0.07       | 0.34        | 0.54      |
| symmetry                        | -3.14     | -2.96    | -11.71     | -283.16     | 0.07       | 0.28        | 0.30      |
| fractal_dimension               | -3.44     | -1.03    | -19.71     | -316.20     | 0.02       | 0.10        | 0.09      |

| Pooled Within-Class SSCP Matrix |                |          |                   |
|---------------------------------|----------------|----------|-------------------|
| Variable                        | concave_points | symmetry | fractal_dimension |
| radius                          | 15.85          | -3.14    | -3.44             |
| texture                         | -3.30          | -2.96    | -1.03             |
| perimeter                       | 117.51         | -11.71   | -19.71            |
| area                            | 1689.39        | -283.16  | -316.20           |
| smoothness                      | 0.07           | 0.07     | 0.02              |
| compactness                     | 0.34           | 0.28     | 0.10              |
| concavity                       | 0.54           | 0.30     | 0.09              |
| concave_points                  | 0.27           | 0.11     | 0.02              |
| symmetry                        | 0.11           | 0.31     | 0.04              |
| fractal_dimension               | 0.02           | 0.04     | 0.02              |

### The DISCRIM Procedure

| Between-Class SSCP Matrix |           |           |            |             |            |             |           |
|---------------------------|-----------|-----------|------------|-------------|------------|-------------|-----------|
| Variable                  | radius    | texture   | perimeter  | area        | smoothness | compactness | concavity |
| radius                    | 2834.93   | 2025.65   | 20028.01   | 274063.28   | 6.84       | 39.36       | 66.78     |
| texture                   | 2025.65   | 1447.39   | 14310.67   | 195827.15   | 4.89       | 28.13       | 47.71     |
| perimeter                 | 20028.01  | 14310.67  | 141492.47  | 1936182.75  | 48.36      | 278.10      | 471.77    |
| area                      | 274063.28 | 195827.15 | 1936182.75 | 26494721.73 | 661.71     | 3805.48     | 6455.64   |
| smoothness                | 6.84      | 4.89      | 48.36      | 661.71      | 0.02       | 0.10        | 0.16      |
| compactness               | 39.36     | 28.13     | 278.10     | 3805.48     | 0.10       | 0.55        | 0.93      |
| concavity                 | 66.78     | 47.71     | 471.77     | 6455.64     | 0.16       | 0.93        | 1.57      |
| concave_points            | 35.27     | 25.20     | 249.17     | 3409.59     | 0.09       | 0.49        | 0.83      |
| symmetry                  | 11.57     | 8.27      | 81.77      | 1118.92     | 0.03       | 0.16        | 0.27      |
| fractal_dimension         | 0.47      | 0.34      | 3.34       | 45.72       | 0.00       | 0.01        | 0.01      |

| Between-Class SSCP Matrix |                |          |                   |
|---------------------------|----------------|----------|-------------------|
| Variable                  | concave_points | symmetry | fractal_dimension |
| radius                    | 35.27          | 11.57    | 0.47              |
| texture                   | 25.20          | 8.27     | 0.34              |
| perimeter                 | 249.17         | 81.77    | 3.34              |
| area                      | 3409.59        | 1118.92  | 45.72             |
| smoothness                | 0.09           | 0.03     | 0.00              |
| compactness               | 0.49           | 0.16     | 0.01              |
| concavity                 | 0.83           | 0.27     | 0.01              |
| concave_points            | 0.44           | 0.14     | 0.01              |
| symmetry                  | 0.14           | 0.05     | 0.00              |
| fractal_dimension         | 0.01           | 0.00     | 0.00              |

### The DISCRIM Procedure

| Total-Sample SSCP Matrix |           |           |            |             |            |             |           |
|--------------------------|-----------|-----------|------------|-------------|------------|-------------|-----------|
| Variable                 | radius    | texture   | perimeter  | area        | smoothness | compactness | concavity |
| radius                   | 5452.51   | 2120.09   | 37643.08   | 536839.97   | 5.33       | 45.14       | 88.93     |
| texture                  | 2120.09   | 8396.99   | 14976.05   | 210633.44   | 0.05       | 25.90       | 46.73     |
| perimeter                | 37643.08  | 14976.05  | 261108.85  | 3711680.71  | 42.83      | 343.60      | 652.05    |
| area                     | 536839.97 | 210633.44 | 3711680.71 | 54220487.68 | 533.68     | 4415.50     | 8999.23   |
| smoothness               | 5.33      | 0.05      | 42.83      | 533.68      | 0.09       | 0.24        | 0.31      |
| compactness              | 45.14     | 25.90     | 343.60     | 4415.50     | 0.24       | 1.36        | 1.82      |
| concavity                | 88.93     | 46.73     | 652.05     | 8999.23     | 0.31       | 1.82        | 3.06      |
| concave_points           | 51.11     | 21.90     | 366.68     | 5098.98     | 0.15       | 0.83        | 1.38      |
| symmetry                 | 8.43      | 5.31      | 70.06      | 835.76      | 0.10       | 0.44        | 0.57      |
| fractal_dimension        | -2.96     | -0.69     | -16.37     | -270.49     | 0.03       | 0.10        | 0.10      |

| Total-Sample SSCP Matrix |                |          |                   |
|--------------------------|----------------|----------|-------------------|
| Variable                 | concave_points | symmetry | fractal_dimension |
| radius                   | 51.11          | 8.43     | -2.96             |
| texture                  | 21.90          | 5.31     | -0.69             |
| perimeter                | 366.68         | 70.06    | -16.37            |
| area                     | 5098.98        | 835.76   | -270.49           |
| smoothness               | 0.15           | 0.10     | 0.03              |
| compactness              | 0.83           | 0.44     | 0.10              |
| concavity                | 1.38           | 0.57     | 0.10              |
| concave_points           | 0.71           | 0.26     | 0.03              |
| symmetry                 | 0.26           | 0.36     | 0.04              |
| fractal_dimension        | 0.03           | 0.04     | 0.02              |

**The DISCRIM Procedure**  
**Within-Class Covariance Matrices**

| diagnosis = 0, DF = 283 |           |           |            |             |            |             |           |
|-------------------------|-----------|-----------|------------|-------------|------------|-------------|-----------|
| Variable                | radius    | texture   | perimeter  | area        | smoothness | compactness | concavity |
| radius                  | 3.07914   | -0.43250  | 20.26318   | 232.95274   | -0.00280   | 0.00291     | 0.00375   |
| texture                 | -0.43250  | 15.58102  | -3.04367   | -35.32726   | -0.01161   | -0.00880    | -0.01008  |
| perimeter               | 20.26318  | -3.04367  | 134.10085  | 1532.24679  | -0.01285   | 0.04508     | 0.05060   |
| area                    | 232.95274 | -35.32726 | 1532.24679 | 17799.29352 | -0.24231   | 0.19119     | 0.30915   |
| smoothness              | -0.00280  | -0.01161  | -0.01285   | -0.24231    | 0.00016    | 0.00023     | 0.00015   |
| compactness             | 0.00291   | -0.00880  | 0.04508    | 0.19119     | 0.00023    | 0.00099     | 0.00095   |
| concavity               | 0.00375   | -0.01008  | 0.05060    | 0.30915     | 0.00015    | 0.00095     | 0.00157   |
| concave_points          | 0.01070   | -0.01016  | 0.07940    | 0.80742     | 0.00010    | 0.00035     | 0.00043   |
| symmetry                | -0.00802  | -0.00125  | -0.04454   | -0.62235    | 0.00013    | 0.00032     | 0.00034   |
| fractal_dimension       | -0.00607  | -0.00202  | -0.03621   | -0.45549    | 0.00004    | 0.00014     | 0.00015   |

| diagnosis = 0, DF = 283 |                |          |                   |
|-------------------------|----------------|----------|-------------------|
| Variable                | concave_points | symmetry | fractal_dimension |
| radius                  | 0.01070        | -0.00802 | -0.00607          |
| texture                 | -0.01016       | -0.00125 | -0.00202          |
| perimeter               | 0.07940        | -0.04454 | -0.03621          |
| area                    | 0.80742        | -0.62235 | -0.45549          |
| smoothness              | 0.00010        | 0.00013  | 0.00004           |
| compactness             | 0.00035        | 0.00032  | 0.00014           |
| concavity               | 0.00043        | 0.00034  | 0.00015           |
| concave_points          | 0.00023        | 0.00012  | 0.00003           |
| symmetry                | 0.00012        | 0.00061  | 0.00006           |
| fractal_dimension       | 0.00003        | 0.00006  | 0.00004           |

**The DISCRIM Procedure**  
**Within-Class Covariance Matrices**

| diagnosis = 1, DF = 170 |           |          |           |             |            |             |           |
|-------------------------|-----------|----------|-----------|-------------|------------|-------------|-----------|
| Variable                | radius    | texture  | perimeter | area        | smoothness | compactness | concavity |
| radius                  | 10.2717   | 1.2755   | 69.8858   | 1157.9475   | -0.0043    | 0.0291      | 0.1241    |
| texture                 | 1.2755    | 14.9421  | 8.9808    | 145.9053    | -0.0092    | 0.0015      | 0.0110    |
| perimeter               | 69.8858   | 8.9808   | 480.3873  | 7893.3654   | -0.0111    | 0.3102      | 0.9762    |
| area                    | 1157.9475 | 145.9053 | 7893.3654 | 133462.1523 | -0.3497    | 3.2701      | 14.4476   |
| smoothness              | -0.0043   | -0.0092  | -0.0111   | -0.3497     | 0.0002     | 0.0005      | 0.0006    |
| compactness             | 0.0291    | 0.0015   | 0.3102    | 3.2701      | 0.0005     | 0.0031      | 0.0037    |
| concavity               | 0.1241    | 0.0110   | 0.9762    | 14.4476     | 0.0006     | 0.0037      | 0.0061    |
| concave_points          | 0.0754    | -0.0025  | 0.5591    | 8.5935      | 0.0002     | 0.0014      | 0.0025    |
| symmetry                | -0.0052   | -0.0153  | 0.0052    | -0.6296     | 0.0002     | 0.0011      | 0.0012    |
| fractal_dimension       | -0.0101   | -0.0027  | -0.0557   | -1.1018     | 0.0001     | 0.0003      | 0.0003    |

| diagnosis = 1, DF = 170 |                |          |                   |
|-------------------------|----------------|----------|-------------------|
| Variable                | concave_points | symmetry | fractal_dimension |
| radius                  | 0.0754         | -0.0052  | -0.0101           |
| texture                 | -0.0025        | -0.0153  | -0.0027           |
| perimeter               | 0.5591         | 0.0052   | -0.0557           |
| area                    | 8.5935         | -0.6296  | -1.1018           |
| smoothness              | 0.0002         | 0.0002   | 0.0001            |
| compactness             | 0.0014         | 0.0011   | 0.0003            |
| concavity               | 0.0025         | 0.0012   | 0.0003            |
| concave_points          | 0.0012         | 0.0005   | 0.0001            |
| symmetry                | 0.0005         | 0.0008   | 0.0001            |
| fractal_dimension       | 0.0001         | 0.0001   | 0.0001            |



## The DISCRIM Procedure

| Pooled Within-Class Covariance Matrix, DF = 453 |           |          |            |             |            |             |           |
|---|-----------|----------|------------|-------------|------------|-------------|-----------|
| Variable  | radius    | texture  | perimeter  | area        | smoothness | compactness | concavity |
| radius  | 5.77833   | 0.20847  | 38.88535   | 580.08101   | -0.00335   | 0.01274     | 0.04891   |
| texture   | 0.20847   | 15.34127 | 1.46884    | 32.68497    | -0.01069   | -0.00492    | -0.00218  |
| perimeter                                       | 38.88535  | 1.46884  | 264.05382  | 3919.42156  | -0.01219   | 0.14459     | 0.39797   |
| area  | 580.08101 | 32.68497 | 3919.42156 | 61204.78137 | -0.28262   | 1.34663     | 5.61497   |
| smoothness                                      | -0.00335  | -0.01069 | -0.01219   | -0.28262    | 0.00016    | 0.00032     | 0.00033   |
| compactness                                     | 0.01274   | -0.00492 | 0.14459    | 1.34663     | 0.00032    | 0.00179     | 0.00198   |
| concavity                                       | 0.04891   | -0.00218 | 0.39797    | 5.61497     | 0.00033    | 0.00198     | 0.00327   |
| concave_points                                  | 0.03498   | -0.00730 | 0.25941    | 3.72934     | 0.00015    | 0.00075     | 0.00120   |
| symmetry  | -0.00694  | -0.00653 | -0.02585   | -0.62507    | 0.00016    | 0.00062     | 0.00066   |
| fractal_dimension                               | -0.00758  | -0.00227 | -0.04352   | -0.69802    | 0.00005    | 0.00021     | 0.00020   |

| Pooled Within-Class Covariance Matrix, DF = 453 |                |          |                   |
|---|----------------|----------|-------------------|
| Variable  | concave_points | symmetry | fractal_dimension |
| radius  | 0.03498        | -0.00694 | -0.00758          |
| texture   | -0.00730       | -0.00653 | -0.00227          |
| perimeter                                       | 0.25941        | -0.02585 | -0.04352          |
| area  | 3.72934        | -0.62507 | -0.69802          |
| smoothness                                      | 0.00015        | 0.00016  | 0.00005           |
| compactness                                     | 0.00075        | 0.00062  | 0.00021           |
| concavity                                       | 0.00120        | 0.00066  | 0.00020           |
| concave_points                                  | 0.00060        | 0.00025  | 0.00005           |
| symmetry  | 0.00025        | 0.00069  | 0.00009           |
| fractal_dimension                               | 0.00005        | 0.00009  | 0.00005           |

### The DISCRIM Procedure

| Between-Class Covariance Matrix, DF = 1 |           |          |           |             |            |             |           |
|---|-----------|----------|-----------|-------------|------------|-------------|-----------|
| Variable                                | radius    | texture  | perimeter | area        | smoothness | compactness | concavity |
| radius                                  | 12.4612   | 8.9040   | 88.0352   | 1204.6737   | 0.0301     | 0.1730      | 0.2935    |
| texture                                 | 8.9040    | 6.3622   | 62.9040   | 860.7787    | 0.0215     | 0.1236      | 0.2097    |
| perimeter                               | 88.0352   | 62.9040  | 621.9449  | 8510.6934   | 0.2126     | 1.2224      | 2.0737    |
| area                                    | 1204.6737 | 860.7787 | 8510.6934 | 116460.3153 | 2.9086     | 16.7274     | 28.3765   |
| smoothness                              | 0.0301    | 0.0215   | 0.2126    | 2.9086      | 0.0001     | 0.0004      | 0.0007    |
| compactness                             | 0.1730    | 0.1236   | 1.2224    | 16.7274     | 0.0004     | 0.0024      | 0.0041    |
| concavity                               | 0.2935    | 0.2097   | 2.0737    | 28.3765     | 0.0007     | 0.0041      | 0.0069    |
| concave_points                          | 0.1550    | 0.1108   | 1.0952    | 14.9872     | 0.0004     | 0.0022      | 0.0037    |
| symmetry                                | 0.0509    | 0.0364   | 0.3594    | 4.9183      | 0.0001     | 0.0007      | 0.0012    |
| fractal_dimension                       | 0.0021    | 0.0015   | 0.0147    | 0.2009      | 0.0000     | 0.0000      | 0.0000    |

| Between-Class Covariance Matrix, DF = 1 |                |          |                   |
|---|----------------|----------|-------------------|
| Variable                                | concave_points | symmetry | fractal_dimension |
| radius                                  | 0.1550         | 0.0509   | 0.0021            |
| texture                                 | 0.1108         | 0.0364   | 0.0015            |
| perimeter                               | 1.0952         | 0.3594   | 0.0147            |
| area                                    | 14.9872        | 4.9183   | 0.2009            |
| smoothness                              | 0.0004         | 0.0001   | 0.0000            |
| compactness                             | 0.0022         | 0.0007   | 0.0000            |
| concavity                               | 0.0037         | 0.0012   | 0.0000            |
| concave_points                          | 0.0019         | 0.0006   | 0.0000            |
| symmetry                                | 0.0006         | 0.0002   | 0.0000            |
| fractal_dimension                       | 0.0000         | 0.0000   | 0.0000            |

### The DISCRIM Procedure

| Total-Sample Covariance Matrix, DF = 454 |           |          |           |             |            |             |           |
|--|-----------|----------|-----------|-------------|------------|-------------|-----------|
| Variable                                 | radius    | texture  | perimeter | area        | smoothness | compactness | concavity |
| radius                                   | 12.0099   | 4.6698   | 82.9143   | 1182.4669   | 0.0117     | 0.0994      | 0.1959    |
| texture                                  | 4.6698    | 18.4956  | 32.9869   | 463.9503    | 0.0001     | 0.0570      | 0.1029    |
| perimeter                                | 82.9143   | 32.9869  | 575.1296  | 8175.5082   | 0.0943     | 0.7568      | 1.4362    |
| area                                     | 1182.4669 | 463.9503 | 8175.5082 | 119428.3870 | 1.1755     | 9.7258      | 19.8221   |
| smoothness                               | 0.0117    | 0.0001   | 0.0943    | 1.1755      | 0.0002     | 0.0005      | 0.0007    |
| compactness                              | 0.0994    | 0.0570   | 0.7568    | 9.7258      | 0.0005     | 0.0030      | 0.0040    |
| concavity                                | 0.1959    | 0.1029   | 1.4362    | 19.8221     | 0.0007     | 0.0040      | 0.0067    |
| concave_points                           | 0.1126    | 0.0482   | 0.8077    | 11.2312     | 0.0003     | 0.0018      | 0.0030    |
| symmetry                                 | 0.0186    | 0.0117   | 0.1543    | 1.8409      | 0.0002     | 0.0010      | 0.0013    |
| fractal_dimension                        | -0.0065   | -0.0015  | -0.0361   | -0.5958     | 0.0001     | 0.0002      | 0.0002    |

| Total-Sample Covariance Matrix, DF = 454 |                |          |                   |
|--|----------------|----------|-------------------|
| Variable                                 | concave_points | symmetry | fractal_dimension |
| radius                                   | 0.1126         | 0.0186   | -0.0065           |
| texture                                  | 0.0482         | 0.0117   | -0.0015           |
| perimeter                                | 0.8077         | 0.1543   | -0.0361           |
| area                                     | 11.2312        | 1.8409   | -0.5958           |
| smoothness                               | 0.0003         | 0.0002   | 0.0001            |
| compactness                              | 0.0018         | 0.0010   | 0.0002            |
| concavity                                | 0.0030         | 0.0013   | 0.0002            |
| concave_points                           | 0.0016         | 0.0006   | 0.0001            |
| symmetry                                 | 0.0006         | 0.0008   | 0.0001            |
| fractal_dimension                        | 0.0001         | 0.0001   | 0.0000            |

**The DISCRIM Procedure**  
**Within-Class Correlation Coefficients / Pr > |r|**

| diagnosis = 0     |                   |                   |                   |                   |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Variable          | radius            | texture           | perimeter         | area              | smoothness        | compactness       | concavity         |
| radius            | 1.0000<br>0.2943  | -0.0624<br>0.2943 | 0.9972<br><.0001  | 0.9951<br><.0001  | -0.1260<br>0.0338 | 0.0526<br>0.3768  | 0.0539<br>0.3657  |
| texture           | -0.0624<br>0.2943 | 1.0000            | -0.0666<br>0.2634 | -0.0671<br>0.2598 | -0.2325<br><.0001 | -0.0709<br>0.2339 | -0.0645<br>0.2789 |
| perimeter         | 0.9972<br><.0001  | -0.0666<br>0.2634 | 1.0000            | 0.9918<br><.0001  | -0.0878<br>0.1400 | 0.1238<br>0.0371  | 0.1103<br>0.0634  |
| area              | 0.9951<br><.0001  | -0.0671<br>0.2598 | 0.9918<br><.0001  | 1.0000            | -0.1436<br>0.0154 | 0.0456<br>0.4443  | 0.0585<br>0.3260  |
| smoothness        | -0.1260<br>0.0338 | -0.2325<br><.0001 | -0.0878<br>0.1400 | -0.1436<br>0.0154 | 1.0000            | 0.5779<br><.0001  | 0.2917<br><.0001  |
| compactness       | 0.0526<br>0.3768  | -0.0709<br>0.2339 | 0.1238<br>0.0371  | 0.0456<br>0.4443  | 0.5779<br><.0001  | 1.0000            | 0.7664<br><.0001  |
| concavity         | 0.0539<br>0.3657  | -0.0645<br>0.2789 | 0.1103<br>0.0634  | 0.0585<br>0.3260  | 0.2917<br><.0001  | 0.7664<br><.0001  | 1.0000            |
| concave_points    | 0.4046<br><.0001  | -0.1708<br>0.0039 | 0.4551<br><.0001  | 0.4017<br><.0001  | 0.5127<br><.0001  | 0.7484<br><.0001  | 0.7217<br><.0001  |
| symmetry          | -0.1854<br>0.0017 | -0.0129<br>0.8286 | -0.1561<br>0.0084 | -0.1894<br>0.0013 | 0.4281<br><.0001  | 0.4135<br><.0001  | 0.3458<br><.0001  |
| fractal_dimension | -0.5301<br><.0001 | -0.0783<br>0.1881 | -0.4791<br><.0001 | -0.5231<br><.0001 | 0.5132<br><.0001  | 0.6928<br><.0001  | 0.5799<br><.0001  |

| diagnosis = 0     |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|
| Variable          | concave_points    | symmetry          | fractal_dimension |
| radius            | 0.4046<br><.0001  | -0.1854<br>0.0017 | -0.5301<br><.0001 |
| texture           | -0.1708<br>0.0039 | -0.0129<br>0.8286 | -0.0783<br>0.1881 |
| perimeter         | 0.4551<br><.0001  | -0.1561<br>0.0084 | -0.4791<br><.0001 |
| area              | 0.4017<br><.0001  | -0.1894<br>0.0013 | -0.5231<br><.0001 |
| smoothness        | 0.5127<br><.0001  | 0.4281<br><.0001  | 0.5132<br><.0001  |
| compactness       | 0.7484<br><.0001  | 0.4135<br><.0001  | 0.6928<br><.0001  |
| concavity         | 0.7217<br><.0001  | 0.3458<br><.0001  | 0.5799<br><.0001  |
| concave_points    | 1.0000            | 0.3201<br><.0001  | 0.3131<br><.0001  |
| symmetry          | 0.3201<br><.0001  | 1.0000            | 0.3887<br><.0001  |
| fractal_dimension | 0.3131<br><.0001  | 0.3887<br><.0001  | 1.0000            |

**The DISCRIM Procedure**  
**Within-Class Correlation Coefficients / Pr > |r|**

| diagnosis = 1     |                   |                   |                   |                   |                   |                  |                  |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|
| Variable          | radius            | texture           | perimeter         | area              | smoothness        | compactness      | concavity        |
| radius            | 1.0000<br>0.1802  | 0.1030<br>0.1802  | 0.9949<br><.0001  | 0.9890<br><.0001  | -0.1041<br>0.1756 | 0.1626<br>0.0336 | 0.4952<br><.0001 |
| texture           | 0.1030<br>0.1802  | 1.0000            | 0.1060<br>0.1676  | 0.1033<br>0.1787  | -0.1857<br>0.0150 | 0.0071<br>0.9270 | 0.0363<br>0.6376 |
| perimeter         | 0.9949<br><.0001  | 0.1060<br>0.1676  | 1.0000            | 0.9858<br><.0001  | -0.0396<br>0.6071 | 0.2533<br>0.0008 | 0.5697<br><.0001 |
| area              | 0.9890<br><.0001  | 0.1033<br>0.1787  | 0.9858<br><.0001  | 1.0000            | -0.0749<br>0.3299 | 0.1602<br>0.0364 | 0.5058<br><.0001 |
| smoothness        | -0.1041<br>0.1756 | -0.1857<br>0.0150 | -0.0396<br>0.6071 | -0.0749<br>0.3299 | 1.0000            | 0.6617<br><.0001 | 0.6302<br><.0001 |
| compactness       | 0.1626<br>0.0336  | 0.0071<br>0.9270  | 0.2533<br>0.0008  | 0.1602<br>0.0364  | 0.6617<br><.0001  | 1.0000           | 0.8441<br><.0001 |
| concavity         | 0.4952<br><.0001  | 0.0363<br>0.6376  | 0.5697<br><.0001  | 0.5058<br><.0001  | 0.6302<br><.0001  | 0.8441<br><.0001 | 1.0000           |
| concave_points    | 0.6749<br><.0001  | -0.0188<br>0.8074 | 0.7317<br><.0001  | 0.6748<br><.0001  | 0.5549<br><.0001  | 0.7250<br><.0001 | 0.9119<br><.0001 |
| symmetry          | -0.0562<br>0.4650 | -0.1386<br>0.0707 | 0.0084<br>0.9135  | -0.0603<br>0.4337 | 0.5665<br><.0001  | 0.7041<br><.0001 | 0.5378<br><.0001 |
| fractal_dimension | -0.4016<br><.0001 | -0.0885<br>0.2498 | -0.3237<br><.0001 | -0.3842<br><.0001 | 0.7369<br><.0001  | 0.7494<br><.0001 | 0.4542<br><.0001 |

| diagnosis = 1     |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|
| Variable          | concave_points    | symmetry          | fractal_dimension |
| radius            | 0.6749<br><.0001  | -0.0562<br>0.4650 | -0.4016<br><.0001 |
| texture           | -0.0188<br>0.8074 | -0.1386<br>0.0707 | -0.0885<br>0.2498 |
| perimeter         | 0.7317<br><.0001  | 0.0084<br>0.9135  | -0.3237<br><.0001 |
| area              | 0.6748<br><.0001  | -0.0603<br>0.4337 | -0.3842<br><.0001 |
| smoothness        | 0.5549<br><.0001  | 0.5665<br><.0001  | 0.7369<br><.0001  |
| compactness       | 0.7250<br><.0001  | 0.7041<br><.0001  | 0.7494<br><.0001  |
| concavity         | 0.9119<br><.0001  | 0.5378<br><.0001  | 0.4542<br><.0001  |
| concave_points    | 1.0000            | 0.4660<br><.0001  | 0.2834<br>0.0002  |
| symmetry          | 0.4660<br><.0001  | 1.0000            | 0.6295<br><.0001  |
| fractal_dimension | 0.2834<br>0.0002  | 0.6295<br><.0001  | 1.0000            |

## The DISCRIM Procedure

| Pooled Within-Class Correlation Coefficients / Pr >  r |                   |                   |                   |                   |                   |                   |                   |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Variable   | radius            | texture           | perimeter         | area              | smoothness        | compactness       | concavity         |
| radius   | 1.0000<br>0.6380  | 0.0221<br>0.6380  | 0.9955<br><.0001  | 0.9754<br><.0001  | -0.1096<br>0.0195 | 0.1253<br>0.0075  | 0.3556<br><.0001  |
| texture  | 0.0221<br>0.6380  | 1.0000            | 0.0231<br>0.6238  | 0.0337<br>0.4734  | -0.2151<br><.0001 | -0.0297<br>0.5277 | -0.0097<br>0.8360 |
| perimeter  | 0.9955<br><.0001  | 0.0231<br>0.6238  | 1.0000            | 0.9750<br><.0001  | -0.0591<br>0.2088 | 0.2103<br><.0001  | 0.4280<br><.0001  |
| area   | 0.9754<br><.0001  | 0.0337<br>0.4734  | 0.9750<br><.0001  | 1.0000            | -0.0900<br>0.0553 | 0.1286<br>0.0061  | 0.3966<br><.0001  |
| smoothness   | -0.1096<br>0.0195 | -0.2151<br><.0001 | -0.0591<br>0.2088 | -0.0900<br>0.0553 | 1.0000            | 0.5975<br><.0001  | 0.4508<br><.0001  |
| compactness  | 0.1253<br>0.0075  | -0.0297<br>0.5277 | 0.2103<br><.0001  | 0.1286<br>0.0061  | 0.5975<br><.0001  | 1.0000            | 0.8181<br><.0001  |
| concavity  | 0.3556<br><.0001  | -0.0097<br>0.8360 | 0.4280<br><.0001  | 0.3966<br><.0001  | 0.4508<br><.0001  | 0.8181<br><.0001  | 1.0000            |
| concave_points   | 0.5951<br><.0001  | -0.0762<br>0.1050 | 0.6529<br><.0001  | 0.6165<br><.0001  | 0.4954<br><.0001  | 0.7266<br><.0001  | 0.8590<br><.0001  |
| symmetry   | -0.1103<br>0.0188 | -0.0637<br>0.1756 | -0.0607<br>0.1964 | -0.0965<br>0.0399 | 0.4842<br><.0001  | 0.5617<br><.0001  | 0.4418<br><.0001  |
| fractal_dimension                                      | -0.4474<br><.0001 | -0.0821<br>0.0805 | -0.3798<br><.0001 | -0.4001<br><.0001 | 0.6053<br><.0001  | 0.7112<br><.0001  | 0.4913<br><.0001  |

| Pooled Within-Class Correlation Coefficients / Pr >  r |                   |                   |                   |
|--|-------------------|-------------------|-------------------|
| Variable   | concave_points    | symmetry          | fractal_dimension |
| radius   | 0.5951<br><.0001  | -0.1103<br>0.0188 | -0.4474<br><.0001 |
| texture  | -0.0762<br>0.1050 | -0.0637<br>0.1756 | -0.0821<br>0.0805 |
| perimeter  | 0.6529<br><.0001  | -0.0607<br>0.1964 | -0.3798<br><.0001 |
| area   | 0.6165<br><.0001  | -0.0965<br>0.0399 | -0.4001<br><.0001 |
| smoothness   | 0.4954<br><.0001  | 0.4842<br><.0001  | 0.6053<br><.0001  |
| compactness  | 0.7266<br><.0001  | 0.5617<br><.0001  | 0.7112<br><.0001  |
| concavity  | 0.8590<br><.0001  | 0.4418<br><.0001  | 0.4913<br><.0001  |
| concave_points   | 1.0000            | 0.3881<br><.0001  | 0.2803<br><.0001  |
| symmetry   | 0.3881<br><.0001  | 1.0000            | 0.4984<br><.0001  |
| fractal_dimension                                      | 0.2803<br><.0001  | 0.4984<br><.0001  | 1.0000            |

## The DISCRIM Procedure

| Between-Class Correlation Coefficients / Pr >  r |             |             |             |             |             |             |             |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Variable   | radius      | texture     | perimeter   | area        | smoothness  | compactness | concavity   |
| radius   | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| texture  | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| perimeter  | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| area   | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| smoothness                                       | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| compactness                                      | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| concavity  | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| concave_points                                   | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| symmetry   | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |
| fractal_dimension                                | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. | 1.0000<br>. |

| Between-Class Correlation Coefficients / Pr >  r |                |             |                   |
|--|----------------|-------------|-------------------|
| Variable   | concave_points | symmetry    | fractal_dimension |
| radius   | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| texture  | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| perimeter  | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| area   | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| smoothness                                       | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| compactness                                      | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| concavity  | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| concave_points                                   | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| symmetry   | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |
| fractal_dimension                                | 1.0000<br>.    | 1.0000<br>. | 1.0000<br>.       |

## The DISCRIM Procedure

| Total-Sample Correlation Coefficients / Pr >  r |                   |                   |                   |                   |                  |                  |                  |
|---|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|
| Variable  | radius            | texture           | perimeter         | area              | smoothness       | compactness      | concavity        |
| radius  | 1.0000            | 0.3133<br><.0001  | 0.9976<br><.0001  | 0.9873<br><.0001  | 0.2412<br><.0001 | 0.5246<br><.0001 | 0.6889<br><.0001 |
| texture   | 0.3133<br><.0001  | 1.0000            | 0.3198<br><.0001  | 0.3122<br><.0001  | 0.0017<br>0.9708 | 0.2426<br><.0001 | 0.2917<br><.0001 |
| perimeter                                       | 0.9976<br><.0001  | 0.3198<br><.0001  | 1.0000            | 0.9865<br><.0001  | 0.2802<br><.0001 | 0.5771<br><.0001 | 0.7299<br><.0001 |
| area  | 0.9873<br><.0001  | 0.3122<br><.0001  | 0.9865<br><.0001  | 1.0000            | 0.2422<br><.0001 | 0.5147<br><.0001 | 0.6991<br><.0001 |
| smoothness                                      | 0.2412<br><.0001  | 0.0017<br>0.9708  | 0.2802<br><.0001  | 0.2422<br><.0001  | 1.0000           | 0.6896<br><.0001 | 0.5918<br><.0001 |
| compactness                                     | 0.5246<br><.0001  | 0.2426<br><.0001  | 0.5771<br><.0001  | 0.5147<br><.0001  | 0.6896<br><.0001 | 1.0000           | 0.8957<br><.0001 |
| concavity                                       | 0.6889<br><.0001  | 0.2917<br><.0001  | 0.7299<br><.0001  | 0.6991<br><.0001  | 0.5918<br><.0001 | 0.8957<br><.0001 | 1.0000           |
| concave_points                                  | 0.8217<br><.0001  | 0.2837<br><.0001  | 0.8519<br><.0001  | 0.8220<br><.0001  | 0.6142<br><.0001 | 0.8459<br><.0001 | 0.9338<br><.0001 |
| symmetry  | 0.1908<br><.0001  | 0.0969<br>0.0389  | 0.2291<br><.0001  | 0.1897<br><.0001  | 0.5634<br><.0001 | 0.6350<br><.0001 | 0.5474<br><.0001 |
| fractal_dimension                               | -0.2668<br><.0001 | -0.0500<br>0.2868 | -0.2131<br><.0001 | -0.2443<br><.0001 | 0.5710<br><.0001 | 0.5862<br><.0001 | 0.3841<br><.0001 |

| Total-Sample Correlation Coefficients / Pr >  r |                  |                  |                   |
|---|------------------|------------------|-------------------|
| Variable  | concave_points   | symmetry         | fractal_dimension |
| radius  | 0.8217<br><.0001 | 0.1908<br><.0001 | -0.2668<br><.0001 |
| texture   | 0.2837<br><.0001 | 0.0969<br>0.0389 | -0.0500<br>0.2868 |
| perimeter                                       | 0.8519<br><.0001 | 0.2291<br><.0001 | -0.2131<br><.0001 |
| area  | 0.8220<br><.0001 | 0.1897<br><.0001 | -0.2443<br><.0001 |
| smoothness                                      | 0.6142<br><.0001 | 0.5634<br><.0001 | 0.5710<br><.0001  |
| compactness                                     | 0.8459<br><.0001 | 0.6350<br><.0001 | 0.5862<br><.0001  |
| concavity                                       | 0.9338<br><.0001 | 0.5474<br><.0001 | 0.3841<br><.0001  |
| concave_points                                  | 1.0000           | 0.5091<br><.0001 | 0.2193<br><.0001  |
| symmetry  | 0.5091<br><.0001 | 1.0000           | 0.4850<br><.0001  |
| fractal_dimension                               | 0.2193<br><.0001 | 0.4850<br><.0001 | 1.0000            |



### The DISCRIM Procedure Simple Statistics

| Total-Sample      |     |          |           |           |                    |
|-------------------|-----|----------|-----------|-----------|--------------------|
| Variable          | N   | Sum      | Mean      | Variance  | Standard Deviation |
| radius            | 455 | 6416     | 14.10102  | 12.00994  | 3.4655             |
| texture           | 455 | 8726     | 19.17738  | 18.49557  | 4.3006             |
| perimeter         | 455 | 41772    | 91.80598  | 575.12962 | 23.9819            |
| area              | 455 | 296368   | 651.35846 | 119428    | 345.5841           |
| smoothness        | 455 | 43.85126 | 0.09638   | 0.0001972 | 0.0140             |
| compactness       | 455 | 47.38853 | 0.10415   | 0.00299   | 0.0547             |
| concavity         | 455 | 40.63379 | 0.08931   | 0.00673   | 0.0820             |
| concave_points    | 455 | 22.30788 | 0.04903   | 0.00156   | 0.0395             |
| symmetry          | 455 | 82.52000 | 0.18136   | 0.0007886 | 0.0281             |
| fractal_dimension | 455 | 28.55448 | 0.06276   | 0.0000498 | 0.007057           |

| diagnosis = 0     |     |          |           |           |                    |
|-------------------|-----|----------|-----------|-----------|--------------------|
| Variable          | N   | Sum      | Mean      | Variance  | Standard Deviation |
| radius            | 284 | 3455     | 12.16413  | 3.07914   | 1.7547             |
| texture           | 284 | 5053     | 17.79342  | 15.58102  | 3.9473             |
| perimeter         | 284 | 22187    | 78.12239  | 134.10085 | 11.5802            |
| area              | 284 | 131808   | 464.11232 | 17799     | 133.4140           |
| smoothness        | 284 | 26.04277 | 0.09170   | 0.0001599 | 0.0126             |
| compactness       | 284 | 21.94075 | 0.07726   | 0.0009891 | 0.0315             |
| concavity         | 284 | 12.40542 | 0.04368   | 0.00157   | 0.0396             |
| concave_points    | 284 | 7.08061  | 0.02493   | 0.0002270 | 0.0151             |
| symmetry          | 284 | 49.26120 | 0.17345   | 0.0006067 | 0.0246             |
| fractal_dimension | 284 | 17.73126 | 0.06243   | 0.0000426 | 0.006527           |

| diagnosis = 1  |     |          |           |           |                    |
|----------------|-----|----------|-----------|-----------|--------------------|
| Variable       | N   | Sum      | Mean      | Variance  | Standard Deviation |
| radius         | 171 | 2961     | 17.31784  | 10.27169  | 3.2049             |
| texture        | 171 | 3672     | 21.47591  | 14.94214  | 3.8655             |
| perimeter      | 171 | 19585    | 114.53193 | 480.38729 | 21.9177            |
| area           | 171 | 164560   | 962.34035 | 133462    | 365.3247           |
| smoothness     | 171 | 17.80849 | 0.10414   | 0.0001632 | 0.0128             |
| compactness    | 171 | 25.44778 | 0.14882   | 0.00312   | 0.0559             |
| concavity      | 171 | 28.22837 | 0.16508   | 0.00611   | 0.0782             |
| concave_points | 171 | 15.22727 | 0.08905   | 0.00122   | 0.0349             |

**The DISCRIM Procedure**  
**Simple Statistics**

| diagnosis = 1            |     |          |         |           |                       |
|--------------------------|-----|----------|---------|-----------|-----------------------|
| Variable                 | N   | Sum      | Mean    | Variance  | Standard<br>Deviation |
| <b>symmetry</b>          | 171 | 33.25880 | 0.19450 | 0.0008181 | 0.0286                |
| <b>fractal_dimension</b> | 171 | 10.82322 | 0.06329 | 0.0000616 | 0.007849              |

### The DISCRIM Procedure

| Total-Sample Standardized Class Means |              |             |
|---------------------------------------|--------------|-------------|
| Variable                              | 0            | 1           |
| radius                                | -0.558899739 | 0.928231146 |
| texture                               | -0.321804848 | 0.534459513 |
| perimeter                             | -0.570580575 | 0.947630897 |
| area                                  | -0.541825056 | 0.899873193 |
| smoothness                            | -0.333036207 | 0.553112766 |
| compactness                           | -0.491830614 | 0.816841488 |
| concavity                             | -0.556059708 | 0.923514369 |
| concave_points                        | -0.609500630 | 1.012270052 |
| symmetry                              | -0.281592287 | 0.467673740 |
| fractal_dimension                     | -0.045783315 | 0.076037786 |

| Pooled Within-Class Standardized Class Means |              |             |
|--|--------------|-------------|
| Variable                                     | 0            | 1           |
| radius                                       | -0.805755322 | 1.338213517 |
| texture                                      | -0.353342417 | 0.586837698 |
| perimeter                                    | -0.842080532 | 1.398543106 |
| area   | -0.756868085 | 1.257020679 |
| smoothness                                   | -0.368409274 | 0.611861016 |
| compactness                                  | -0.635646936 | 1.055694327 |
| concavity                                    | -0.797296159 | 1.324164382 |
| concave_points                               | -0.985498567 | 1.636734463 |
| symmetry                                     | -0.301910288 | 0.501418256 |
| fractal_dimension                            | -0.045812853 | 0.076086844 |

| Within Covariance Matrix Information |                        |   |
|--------------------------------------|------------------------|---|
| diagnosis                            | Covariance Matrix Rank | Natural Log of the Determinant of the Covariance Matrix |
| 0                                    | 10                     | -47.00514   |
| 1                                    | 10                     | -39.38434   |
| Pooled                               | 10                     | -40.67387   |

**The DISCRIM Procedure**  
**Test of Homogeneity of Within Covariance Matrices**

| Chi-Square  | DF | Pr > ChiSq |
|-------------|----|------------|
| 1533.198119 | 55 | <.0001     |

Since the Chi-Square value is significant at the 0.1 level, the within covariance matrices will be used in the discriminant function.

Reference: Morrison, D.F. (1976) Multivariate Statistical Methods p252.

**The DISCRIM Procedure**

| Squared Distance to diagnosis |           |         |
|-------------------------------|-----------|---------|
| From diagnosis                | 0         | 1       |
| 0                             | 0         | 8.71487 |
| 1                             | 105.77149 | 0       |

| Generalized Squared Distance to diagnosis |           |           |
|---|-----------|-----------|
| From diagnosis                            | 0         | 1         |
| 0   | -47.00514 | -30.66947 |
| 1   | 58.76635  | -39.38434 |

### The DISCRIM Procedure

| Univariate Test Statistics         |                                |                                 |                                  |          |                       |         |        |
|------------------------------------|--------------------------------|---------------------------------|----------------------------------|----------|-----------------------|---------|--------|
| F Statistics, Num DF=1, Den DF=453 |                                |                                 |                                  |          |                       |         |        |
| Variable                           | Total<br>Standard<br>Deviation | Pooled<br>Standard<br>Deviation | Between<br>Standard<br>Deviation | R-Square | R-Square<br>/ (1-RSq) | F Value | Pr > F |
| radius                             | 3.4655                         | 2.4038                          | 3.5300                           | 0.5199   | 1.0830                | 490.61  | <.0001 |
| texture                            | 4.3006                         | 3.9168                          | 2.5223                           | 0.1724   | 0.2083                | 94.35   | <.0001 |
| perimeter                          | 23.9819                        | 16.2497                         | 24.9388                          | 0.5419   | 1.1829                | 535.85  | <.0001 |
| area                               | 345.5841                       | 247.3960                        | 341.2628                         | 0.4886   | 0.9556                | 432.89  | <.0001 |
| smoothness                         | 0.0140                         | 0.0127                          | 0.008523                         | 0.1846   | 0.2264                | 102.56  | <.0001 |
| compactness                        | 0.0547                         | 0.0423                          | 0.0490                           | 0.4026   | 0.6740                | 305.33  | <.0001 |
| concavity                          | 0.0820                         | 0.0572                          | 0.0832                           | 0.5147   | 1.0604                | 480.37  | <.0001 |
| concave_points                     | 0.0395                         | 0.0245                          | 0.0439                           | 0.6183   | 1.6201                | 733.91  | <.0001 |
| symmetry                           | 0.0281                         | 0.0262                          | 0.0144                           | 0.1320   | 0.1521                | 68.88   | <.0001 |
| fractal_dimension                  | 0.007057                       | 0.007052                        | 0.000589                         | 0.0035   | 0.0035                | 1.59    | 0.2085 |

| Average R-Square     |           |
|----------------------|-----------|
| Unweighted           | 0.3578556 |
| Weighted by Variance | 0.4888573 |

| Multivariate Statistics and Exact F Statistics |            |         |        |        |        |
|--|------------|---------|--------|--------|--------|
| S=1 M=4 N=221                                  |            |         |        |        |        |
| Statistic                                      | Value      | F Value | Num DF | Den DF | Pr > F |
| Wilks' Lambda                                  | 0.30619704 | 100.60  | 10     | 444    | <.0001 |
| Pillai's Trace                                 | 0.69380296 | 100.60  | 10     | 444    | <.0001 |
| Hotelling-Lawley Trace                         | 2.26587086 | 100.60  | 10     | 444    | <.0001 |
| Roy's Greatest Root                            | 2.26587086 | 100.60  | 10     | 444    | <.0001 |

**The DISCRIM Procedure**  
**Classification Summary for Calibration Data: WORK.TRAIN\_WDBC\_SUB**  
**Resubstitution Summary using Quadratic Discriminant Function**

| Number of Observations and<br>Percent Classified into diagnosis |              |              |               |
|---|--------------|--------------|---------------|
| From<br>diagnosis   | 0            | 1            | Total         |
| 0   | 276<br>97.18 | 8<br>2.82    | 284<br>100.00 |
| 1   | 20<br>11.70  | 151<br>88.30 | 171<br>100.00 |
| Total   | 296<br>65.05 | 159<br>34.95 | 455<br>100.00 |
| Priors  | 0.5          | 0.5          |               |

| Error Count Estimates for<br>diagnosis |        |        |        |
|--|--------|--------|--------|
|  | 0      | 1      | Total  |
| Rate                                   | 0.0282 | 0.1170 | 0.0726 |
| Priors                                 | 0.5000 | 0.5000 |        |

**The DISCRIM Procedure**  
**Classification Results for Calibration Data: WORK.TRAIN\_WDBC\_SUB**  
**Resubstitution Results using Quadratic Discriminant Function**

| Number of Observations<br>and Average Posterior<br>Probabilities Classified into<br>diagnosis |               |               |
|---|---------------|---------------|
| From<br>diagnosis   | 0             | 1             |
| 0   | 276<br>0.9857 | 8<br>0.9207   |
| 1   | 20<br>0.8398  | 151<br>0.9893 |
| Total   | 296<br>0.9759 | 159<br>0.9858 |
| Priors  | 0.5           | 0.5           |

| Posterior Probability Error Rate<br>Estimates for diagnosis |         |        |        |
|---|---------|--------|--------|
| Estimate  | 0       | 1      | Total  |
| Stratified  | -0.0562 | 0.1005 | 0.0222 |
| Unstratified  | -0.2697 | 0.3110 | 0.0207 |
| Priors  | 0.5000  | 0.5000 |        |



**The DISCRIM Procedure**  
**Classification Summary for Calibration Data: WORK.TRAIN\_WDBC\_SUB**  
**Cross-validation Summary using Quadratic Discriminant Function**

| Number of Observations and<br>Percent Classified into diagnosis |              |              |               |
|---|--------------|--------------|---------------|
| From<br>diagnosis   | 0            | 1            | Total         |
| 0   | 273<br>96.13 | 11<br>3.87   | 284<br>100.00 |
| 1   | 20<br>11.70  | 151<br>88.30 | 171<br>100.00 |
| Total   | 293<br>64.40 | 162<br>35.60 | 455<br>100.00 |
| Priors  | 0.5          | 0.5          |               |

| Error Count Estimates for<br>diagnosis |        |        |        |
|--|--------|--------|--------|
|  | 0      | 1      | Total  |
| Rate                                   | 0.0387 | 0.1170 | 0.0778 |
| Priors                                 | 0.5000 | 0.5000 |        |

**The DISCRIM Procedure**  
**Classification Results for Calibration Data: WORK.TRAIN\_WDBC\_SUB**  
**Cross-validation Results using Quadratic Discriminant Function**

| Number of Observations<br>and Average Posterior<br>Probabilities Classified into<br>diagnosis |               |               |
|---|---------------|---------------|
| From<br>diagnosis   | 0             | 1             |
| 0   | 273<br>0.9851 | 11<br>0.8935  |
| 1   | 20<br>0.8605  | 151<br>0.9867 |
| Total   | 293<br>0.9766 | 162<br>0.9804 |
| Priors  | 0.5           | 0.5           |

| Posterior Probability Error Rate<br>Estimates for diagnosis |         |        |        |
|---|---------|--------|--------|
| Estimate  | 0       | 1      | Total  |
| Stratified  | -0.0476 | 0.0941 | 0.0232 |
| Unstratified  | -0.2578 | 0.3019 | 0.0220 |
| Priors  | 0.5000  | 0.5000 |        |

**The DISCRIM Procedure**  
**Classification Summary for Test Data: WORK.TEST\_WDBC\_SUB**  
**Classification Summary using Quadratic Discriminant Function**

| Observation Profile for Test Data |     |
|-----------------------------------|-----|
| Number of Observations Read       | 114 |
| Number of Observations Used       | 114 |

| Number of Observations and<br>Percent Classified into diagnosis |             |             |               |
|---|-------------|-------------|---------------|
| From<br>diagnosis   | 0           | 1           | Total         |
| 0   | 66<br>90.41 | 7<br>9.59   | 73<br>100.00  |
| 1   | 2<br>4.88   | 39<br>95.12 | 41<br>100.00  |
| Total   | 68<br>59.65 | 46<br>40.35 | 114<br>100.00 |
| Priors  | 0.5         | 0.5         |               |

| Error Count Estimates for<br>diagnosis |        |        |        |
|--|--------|--------|--------|
|  | 0      | 1      | Total  |
| Rate                                   | 0.0959 | 0.0488 | 0.0723 |
| Priors                                 | 0.5000 | 0.5000 |        |

**The DISCRIM Procedure**  
**Classification Results for Test Data: WORK.TEST\_WDBC\_SUB**  
**Classification Results using Quadratic Discriminant Function**

| Number of Observations<br>and Average Posterior<br>Probabilities Classified into<br>diagnosis |              |              |
|---|--------------|--------------|
| From<br>diagnosis   | 0            | 1            |
| 0   | 66<br>0.9864 | 7<br>0.9498  |
| 1   | 2<br>0.7785  | 39<br>0.9705 |
| Total   | 68<br>0.9803 | 46<br>0.9674 |
| Priors  | 0.5          | 0.5          |

| Posterior Probability Error Rate<br>Estimates for diagnosis |         |         |        |
|---|---------|---------|--------|
| Estimate  | 0       | 1       | Total  |
| Stratified  | 0.0702  | -0.0143 | 0.0280 |
| Unstratified  | -0.1695 | 0.2193  | 0.0249 |
| Priors  | 0.5000  | 0.5000  |        |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 1   | 12   | 84610002  | 1         | 15.78  | 17.89   | 103.6     | 781   | 0.0971     | 0.1292      | 0.09954   |
| 2   | 16   | 84799002  | 1         | 14.54  | 27.54   | 96.73     | 658.8 | 0.1139     | 0.1595      | 0.1639    |
| 3   | 18   | 84862001  | 1         | 16.13  | 20.68   | 108.1     | 798.8 | 0.117      | 0.2022      | 0.1722    |
| 4   | 21   | 8510653   | 0         | 13.08  | 15.71   | 85.63     | 520   | 0.1075     | 0.127       | 0.04568   |
| 5   | 28   | 852781    | 1         | 18.61  | 20.25   | 122.1     | 1094  | 0.0944     | 0.1066      | 0.149     |
| 6   | 31   | 853401    | 1         | 18.63  | 25.11   | 124.8     | 1088  | 0.1064     | 0.1887      | 0.2319    |
| 7   | 51   | 857343    | 0         | 11.76  | 21.6    | 74.72     | 427.9 | 0.08637    | 0.04966     | 0.01657   |
| 8   | 53   | 857374    | 0         | 11.94  | 18.24   | 75.71     | 437.6 | 0.08261    | 0.04751     | 0.01972   |
| 9   | 54   | 857392    | 1         | 18.22  | 18.7    | 120.3     | 1033  | 0.1148     | 0.1485      | 0.1772    |
| 10  | 55   | 857438    | 1         | 15.1   | 22.02   | 97.26     | 712.8 | 0.09056    | 0.07081     | 0.05253   |
| 11  | 61   | 858970    | 0         | 10.17  | 14.88   | 64.55     | 311.9 | 0.1134     | 0.08061     | 0.01084   |
| 12  | 62   | 858981    | 0         | 8.598  | 20.98   | 54.66     | 221.8 | 0.1243     | 0.08963     | 0.03      |
| 13  | 64   | 859196    | 0         | 9.173  | 13.86   | 59.2      | 260.9 | 0.07721    | 0.08751     | 0.05988   |
| 14  | 67   | 859464    | 0         | 9.465  | 21.01   | 60.11     | 269.4 | 0.1044     | 0.07773     | 0.02172   |
| 15  | 68   | 859465    | 0         | 11.31  | 19.04   | 71.8      | 394.1 | 0.08139    | 0.04701     | 0.03709   |
| 16  | 69   | 859471    | 0         | 9.029  | 17.33   | 58.79     | 250.5 | 0.1066     | 0.1413      | 0.313     |
| 17  | 73   | 859717    | 1         | 17.2   | 24.52   | 114.2     | 929.4 | 0.1071     | 0.183       | 0.1692    |
| 18  | 81   | 861103    | 0         | 11.45  | 20.97   | 73.81     | 401.5 | 0.1102     | 0.09362     | 0.04591   |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 1   | 0.06606        | 0.1842   | 0.06082           | 0.00113 | 0.99887 | 1      |
| 2   | 0.07364        | 0.2303   | 0.07077           | 0.00001 | 0.99999 | 1      |
| 3   | 0.1028         | 0.2164   | 0.07356           | 0.00000 | 1.00000 | 1      |
| 4   | 0.0311         | 0.1967   | 0.06811           | 0.99869 | 0.00131 | 0      |
| 5   | 0.07731        | 0.1697   | 0.05699           | 0.00000 | 1.00000 | 1      |
| 6   | 0.1244         | 0.2183   | 0.06197           | 0.00000 | 1.00000 | 1      |
| 7   | 0.01115        | 0.1495   | 0.05888           | 0.99959 | 0.00041 | 0      |
| 8   | 0.01349        | 0.1868   | 0.0611            | 0.99994 | 0.00006 | 0      |
| 9   | 0.106          | 0.2092   | 0.0631            | 0.00000 | 1.00000 | 1      |
| 10  | 0.03334        | 0.1616   | 0.05684           | 0.57141 | 0.42859 | 0      |
| 11  | 0.0129         | 0.2743   | 0.0696            | 1.00000 | 0.00000 | 0      |
| 12  | 0.009259       | 0.1828   | 0.06757           | 0.99836 | 0.00164 | 0      |
| 13  | 0.0218         | 0.2341   | 0.06963           | 1.00000 | 0.00000 | 0      |
| 14  | 0.01504        | 0.1717   | 0.06899           | 0.99997 | 0.00003 | 0      |
| 15  | 0.0223         | 0.1516   | 0.05667           | 0.99999 | 0.00001 | 0      |
| 16  | 0.04375        | 0.2111   | 0.08046           | 1.00000 | 0.00000 | 0      |
| 17  | 0.07944        | 0.1927   | 0.06487           | 0.00000 | 1.00000 | 1      |
| 18  | 0.02233        | 0.1842   | 0.07005           | 0.99879 | 0.00121 | 0      |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 19  | 82   | 8611161   | 0         | 13.34  | 15.86   | 86.49     | 520   | 0.1078     | 0.1535      | 0.1169    |
| 20  | 92   | 861799    | 1         | 15.37  | 22.76   | 100.2     | 728.2 | 0.092      | 0.1036      | 0.1122    |
| 21  | 97   | 86211     | 0         | 12.18  | 17.84   | 77.79     | 451.1 | 0.1045     | 0.07057     | 0.0249    |
| 22  | 102  | 862722    | 0         | 6.981  | 13.43   | 43.79     | 143.5 | 0.117      | 0.07568     | 0         |
| 23  | 108  | 863270    | 0         | 12.36  | 18.54   | 79.01     | 466.7 | 0.08477    | 0.06815     | 0.02643   |
| 24  | 113  | 86409     | 0         | 14.26  | 19.65   | 97.83     | 629.9 | 0.07837    | 0.2233      | 0.3003    |
| 25  | 118  | 864729    | 1         | 14.87  | 16.67   | 98.64     | 682.5 | 0.1162     | 0.1649      | 0.169     |
| 26  | 124  | 865432    | 0         | 14.5   | 10.89   | 94.28     | 640.7 | 0.1101     | 0.1099      | 0.08842   |
| 27  | 128  | 866203    | 1         | 19     | 18.91   | 123.4     | 1138  | 0.08217    | 0.08028     | 0.09271   |
| 28  | 130  | 866674    | 1         | 19.79  | 25.12   | 130.4     | 1192  | 0.1015     | 0.1589      | 0.2545    |
| 29  | 131  | 866714    | 0         | 12.19  | 13.29   | 79.08     | 455.8 | 0.1066     | 0.09509     | 0.02855   |
| 30  | 144  | 869224    | 0         | 12.9   | 15.92   | 83.74     | 512.2 | 0.08677    | 0.09509     | 0.04894   |
| 31  | 158  | 8711216   | 0         | 16.84  | 19.46   | 108.4     | 880.2 | 0.07445    | 0.07223     | 0.0515    |
| 32  | 165  | 8712289   | 1         | 23.27  | 22.04   | 152.1     | 1686  | 0.08439    | 0.1145      | 0.1324    |
| 33  | 168  | 8712729   | 1         | 16.78  | 18.8    | 109.3     | 886.3 | 0.08865    | 0.09182     | 0.08422   |
| 34  | 172  | 87163     | 1         | 13.43  | 19.63   | 85.84     | 565.4 | 0.09048    | 0.06288     | 0.05858   |
| 35  | 181  | 873592    | 1         | 27.22  | 21.87   | 182.1     | 2250  | 0.1094     | 0.1914      | 0.2871    |
| 36  | 193  | 875099    | 0         | 9.72   | 18.22   | 60.73     | 288.1 | 0.0695     | 0.02344     | 0         |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 19  | 0.06987        | 0.1942   | 0.06902           | 0.00000 | 1.00000 | 1      |
| 20  | 0.07483        | 0.1717   | 0.06097           | 0.00189 | 0.99811 | 1      |
| 21  | 0.02941        | 0.19     | 0.06635           | 0.99188 | 0.00812 | 0      |
| 22  | 0              | 0.193    | 0.07818           | 0.99943 | 0.00057 | 0      |
| 23  | 0.01921        | 0.1602   | 0.06066           | 0.99945 | 0.00055 | 0      |
| 24  | 0.07798        | 0.1704   | 0.07769           | 0.00081 | 0.99919 | 1      |
| 25  | 0.08923        | 0.2157   | 0.06768           | 0.00093 | 0.99907 | 1      |
| 26  | 0.05778        | 0.1856   | 0.06402           | 0.99368 | 0.00632 | 0      |
| 27  | 0.05627        | 0.1946   | 0.05044           | 0.00000 | 1.00000 | 1      |
| 28  | 0.1149         | 0.2202   | 0.06113           | 0.00000 | 1.00000 | 1      |
| 29  | 0.02882        | 0.188    | 0.06471           | 0.99972 | 0.00028 | 0      |
| 30  | 0.03088        | 0.1778   | 0.06235           | 0.99874 | 0.00126 | 0      |
| 31  | 0.02771        | 0.1844   | 0.05268           | 0.00009 | 0.99991 | 1      |
| 32  | 0.09702        | 0.1801   | 0.05553           | 0.00000 | 1.00000 | 1      |
| 33  | 0.06576        | 0.1893   | 0.05534           | 0.00000 | 1.00000 | 1      |
| 34  | 0.03438        | 0.1598   | 0.05671           | 0.98562 | 0.01438 | 0      |
| 35  | 0.1878         | 0.18     | 0.0577            | 0.00000 | 1.00000 | 1      |
| 36  | 0              | 0.1653   | 0.06447           | 1.00000 | 0.00000 | 0      |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 37  | 198  | 877159    | 1         | 18.08  | 21.84   | 117.4     | 1024  | 0.07371    | 0.08642     | 0.1103    |
| 38  | 202  | 877989    | 1         | 17.54  | 19.32   | 115.1     | 951.6 | 0.08968    | 0.1198      | 0.1036    |
| 39  | 206  | 879523    | 1         | 15.12  | 16.68   | 98.78     | 716.6 | 0.08876    | 0.09588     | 0.0755    |
| 40  | 209  | 8810158   | 0         | 13.11  | 22.54   | 87.02     | 529.4 | 0.1002     | 0.1483      | 0.08705   |
| 41  | 217  | 8811523   | 0         | 11.89  | 18.35   | 77.32     | 432.2 | 0.09363    | 0.1154      | 0.06636   |
| 42  | 229  | 88147202  | 0         | 12.62  | 23.97   | 81.35     | 496.4 | 0.07903    | 0.07529     | 0.05438   |
| 43  | 230  | 881861    | 1         | 12.83  | 22.33   | 85.26     | 503.2 | 0.1088     | 0.1799      | 0.1695    |
| 44  | 237  | 88299702  | 1         | 23.21  | 26.97   | 153.5     | 1670  | 0.09509    | 0.1682      | 0.195     |
| 45  | 239  | 883270    | 0         | 14.22  | 27.85   | 92.55     | 623.9 | 0.08223    | 0.1039      | 0.1103    |
| 46  | 248  | 884626    | 0         | 12.89  | 14.11   | 84.95     | 512.2 | 0.0876     | 0.1346      | 0.1374    |
| 47  | 260  | 88725602  | 1         | 15.53  | 33.56   | 103.7     | 744.9 | 0.1063     | 0.1639      | 0.1751    |
| 48  | 261  | 887549    | 1         | 20.31  | 27.06   | 132.9     | 1288  | 0.1        | 0.1088      | 0.1519    |
| 49  | 265  | 889719    | 1         | 17.19  | 22.07   | 111.6     | 928.3 | 0.09726    | 0.08995     | 0.09061   |
| 50  | 268  | 8910499   | 0         | 13.59  | 21.84   | 87.16     | 561   | 0.07956    | 0.08259     | 0.04072   |
| 51  | 270  | 8910720   | 0         | 10.71  | 20.39   | 69.5      | 344.9 | 0.1082     | 0.1289      | 0.08448   |
| 52  | 271  | 8910721   | 0         | 14.29  | 16.82   | 90.3      | 632.6 | 0.06429    | 0.02675     | 0.00725   |
| 53  | 273  | 8910988   | 1         | 21.75  | 20.99   | 147.3     | 1491  | 0.09401    | 0.1961      | 0.2195    |
| 54  | 275  | 8911163   | 1         | 17.93  | 24.48   | 115.2     | 998.9 | 0.08855    | 0.07027     | 0.05699   |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 37  | 0.05778        | 0.177    | 0.0534            | 0.00000 | 1.00000 | 1      |
| 38  | 0.07488        | 0.1506   | 0.05491           | 0.00000 | 1.00000 | 1      |
| 39  | 0.04079        | 0.1594   | 0.05986           | 0.20481 | 0.79519 | 1      |
| 40  | 0.05102        | 0.185    | 0.0731            | 0.01990 | 0.98010 | 1      |
| 41  | 0.03142        | 0.1967   | 0.06314           | 0.99526 | 0.00474 | 0      |
| 42  | 0.02036        | 0.1514   | 0.06019           | 0.99968 | 0.00032 | 0      |
| 43  | 0.06861        | 0.2123   | 0.07254           | 0.15933 | 0.84067 | 1      |
| 44  | 0.1237         | 0.1909   | 0.06309           | 0.00000 | 1.00000 | 1      |
| 45  | 0.04408        | 0.1342   | 0.06129           | 0.97061 | 0.02939 | 0      |
| 46  | 0.0398         | 0.1596   | 0.06409           | 0.99742 | 0.00258 | 0      |
| 47  | 0.08399        | 0.2091   | 0.0665            | 0.00000 | 1.00000 | 1      |
| 48  | 0.09333        | 0.1814   | 0.05572           | 0.00000 | 1.00000 | 1      |
| 49  | 0.06527        | 0.1867   | 0.0558            | 0.00000 | 1.00000 | 1      |
| 50  | 0.02142        | 0.1635   | 0.05859           | 0.96152 | 0.03848 | 0      |
| 51  | 0.02867        | 0.1668   | 0.06862           | 0.95514 | 0.04486 | 0      |
| 52  | 0.00625        | 0.1508   | 0.05376           | 0.99990 | 0.00010 | 0      |
| 53  | 0.1088         | 0.1721   | 0.06194           | 0.00000 | 1.00000 | 1      |
| 54  | 0.04744        | 0.1538   | 0.0551            | 0.00000 | 1.00000 | 1      |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 55  | 276  | 8911164   | 0         | 11.89  | 17.36   | 76.2      | 435.6 | 0.1225     | 0.0721      | 0.05929   |
| 56  | 278  | 8911670   | 1         | 18.81  | 19.98   | 120.9     | 1102  | 0.08923    | 0.05884     | 0.0802    |
| 57  | 285  | 8912284   | 0         | 12.89  | 15.7    | 84.08     | 516.6 | 0.07818    | 0.0958      | 0.1115    |
| 58  | 291  | 89143602  | 0         | 14.41  | 19.73   | 96.03     | 651   | 0.08757    | 0.1676      | 0.1362    |
| 59  | 292  | 8915      | 0         | 14.96  | 19.1    | 97.03     | 687.3 | 0.08992    | 0.09823     | 0.0594    |
| 60  | 307  | 89344     | 0         | 13.2   | 15.82   | 84.07     | 537.3 | 0.08511    | 0.05251     | 0.001461  |
| 61  | 314  | 893988    | 0         | 11.54  | 10.72   | 73.73     | 409.1 | 0.08597    | 0.05969     | 0.01367   |
| 62  | 315  | 894047    | 0         | 8.597  | 18.6    | 54.09     | 221.2 | 0.1074     | 0.05847     | 0         |
| 63  | 317  | 894090    | 0         | 12.18  | 14.08   | 77.25     | 461.4 | 0.07734    | 0.03212     | 0.01123   |
| 64  | 321  | 894604    | 0         | 10.25  | 16.18   | 66.52     | 324.2 | 0.1061     | 0.1111      | 0.06726   |
| 65  | 327  | 89524     | 0         | 14.11  | 12.88   | 90.03     | 616.5 | 0.09309    | 0.05306     | 0.01765   |
| 66  | 338  | 897630    | 1         | 18.77  | 21.43   | 122.9     | 1092  | 0.09116    | 0.1402      | 0.106     |
| 67  | 350  | 899147    | 0         | 11.95  | 14.96   | 77.23     | 426.7 | 0.1158     | 0.1206      | 0.01171   |
| 68  | 357  | 9010259   | 0         | 13.05  | 18.59   | 85.09     | 512   | 0.1082     | 0.1304      | 0.09603   |
| 69  | 363  | 9010598   | 0         | 12.76  | 18.84   | 81.87     | 496.6 | 0.09676    | 0.07952     | 0.02688   |
| 70  | 367  | 9011494   | 1         | 20.2   | 26.83   | 133.7     | 1234  | 0.09905    | 0.1669      | 0.1641    |
| 71  | 371  | 9012315   | 1         | 16.35  | 23.29   | 109       | 840.4 | 0.09742    | 0.1497      | 0.1811    |
| 72  | 382  | 901836    | 0         | 11.04  | 14.93   | 70.67     | 372.7 | 0.07987    | 0.07079     | 0.03546   |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 55  | 0.07404        | 0.2015   | 0.05875           | 0.04062 | 0.95938 | 1      |
| 56  | 0.05843        | 0.155    | 0.04996           | 0.00000 | 1.00000 | 1      |
| 57  | 0.0339         | 0.1432   | 0.05935           | 0.99997 | 0.00003 | 0      |
| 58  | 0.06602        | 0.1714   | 0.07192           | 0.22938 | 0.77062 | 1      |
| 59  | 0.04819        | 0.1879   | 0.05852           | 0.90370 | 0.09630 | 0      |
| 60  | 0.003261       | 0.1632   | 0.05894           | 0.99859 | 0.00141 | 0      |
| 61  | 0.008907       | 0.1833   | 0.061             | 0.99998 | 0.00002 | 0      |
| 62  | 0              | 0.2163   | 0.07359           | 1.00000 | 0.00000 | 0      |
| 63  | 0.005051       | 0.1673   | 0.05649           | 0.99999 | 0.00001 | 0      |
| 64  | 0.03965        | 0.1743   | 0.07279           | 0.99998 | 0.00002 | 0      |
| 65  | 0.02733        | 0.1373   | 0.057             | 0.99903 | 0.00097 | 0      |
| 66  | 0.0609         | 0.1953   | 0.06083           | 0.00000 | 1.00000 | 1      |
| 67  | 0.01787        | 0.2459   | 0.06581           | 0.99991 | 0.00009 | 0      |
| 68  | 0.05603        | 0.2035   | 0.06501           | 0.81727 | 0.18273 | 0      |
| 69  | 0.01781        | 0.1759   | 0.06183           | 0.99684 | 0.00316 | 0      |
| 70  | 0.1265         | 0.1875   | 0.0602            | 0.00000 | 1.00000 | 1      |
| 71  | 0.08773        | 0.2175   | 0.06218           | 0.00000 | 1.00000 | 1      |
| 72  | 0.02074        | 0.2003   | 0.06246           | 1.00000 | 0.00000 | 0      |



| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 73  | 386  | 90291     | 1         | 14.6   | 23.29   | 93.97     | 664.7 | 0.08682    | 0.06636     | 0.0839    |
| 74  | 390  | 90312     | 1         | 19.55  | 23.21   | 128.9     | 1174  | 0.101      | 0.1318      | 0.1856    |
| 75  | 392  | 903483    | 0         | 8.734  | 16.84   | 55.27     | 234.3 | 0.1039     | 0.07428     | 0         |
| 76  | 397  | 90401601  | 0         | 13.51  | 18.89   | 88.1      | 558.1 | 0.1059     | 0.1147      | 0.0858    |
| 77  | 398  | 90401602  | 0         | 12.8   | 17.46   | 83.05     | 508.3 | 0.08044    | 0.08895     | 0.0739    |
| 78  | 404  | 9047      | 0         | 12.94  | 16.17   | 83.18     | 507.6 | 0.09879    | 0.08836     | 0.03296   |
| 79  | 405  | 904969    | 0         | 12.34  | 14.95   | 78.29     | 469.1 | 0.08682    | 0.04571     | 0.02109   |
| 80  | 406  | 904971    | 0         | 10.94  | 18.59   | 70.39     | 370   | 0.1004     | 0.0746      | 0.04944   |
| 81  | 418  | 90602302  | 1         | 15.5   | 21.08   | 102.9     | 803.1 | 0.112      | 0.1571      | 0.1522    |
| 82  | 424  | 906878    | 0         | 13.66  | 19.13   | 89.46     | 575.3 | 0.09057    | 0.1147      | 0.09657   |
| 83  | 436  | 908489    | 1         | 13.98  | 19.62   | 91.12     | 599.5 | 0.106      | 0.1133      | 0.1126    |
| 84  | 447  | 9110732   | 1         | 17.75  | 28.03   | 117.3     | 981.6 | 0.09997    | 0.1314      | 0.1698    |
| 85  | 449  | 911150    | 0         | 14.53  | 19.34   | 94.25     | 659.7 | 0.08388    | 0.078       | 0.08817   |
| 86  | 450  | 911157302 | 1         | 21.1   | 20.52   | 138.1     | 1384  | 0.09684    | 0.1175      | 0.1572    |
| 87  | 457  | 9112366   | 0         | 11.63  | 29.29   | 74.87     | 415.1 | 0.09357    | 0.08574     | 0.0716    |
| 88  | 458  | 9112367   | 0         | 13.21  | 25.25   | 84.1      | 537.9 | 0.08791    | 0.05205     | 0.02772   |
| 89  | 467  | 9113455   | 0         | 13.14  | 20.74   | 85.98     | 536.9 | 0.08675    | 0.1089      | 0.1085    |
| 90  | 483  | 912519    | 0         | 13.47  | 14.06   | 87.32     | 546.3 | 0.1071     | 0.1155      | 0.05786   |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 73  | 0.05271        | 0.1627   | 0.05416           | 0.42513 | 0.57487 | 1      |
| 74  | 0.1021         | 0.1989   | 0.05884           | 0.00000 | 1.00000 | 1      |
| 75  | 0              | 0.1985   | 0.07098           | 0.99999 | 0.00001 | 0      |
| 76  | 0.05381        | 0.1806   | 0.06079           | 0.95979 | 0.04021 | 0      |
| 77  | 0.04083        | 0.1574   | 0.0575            | 0.99981 | 0.00019 | 0      |
| 78  | 0.0239         | 0.1735   | 0.062             | 0.99660 | 0.00340 | 0      |
| 79  | 0.02054        | 0.1571   | 0.05708           | 0.99976 | 0.00024 | 0      |
| 80  | 0.02932        | 0.1486   | 0.06615           | 0.99943 | 0.00057 | 0      |
| 81  | 0.08481        | 0.2085   | 0.06864           | 0.00000 | 1.00000 | 1      |
| 82  | 0.04812        | 0.1848   | 0.06181           | 0.93121 | 0.06879 | 0      |
| 83  | 0.06463        | 0.1669   | 0.06544           | 0.35487 | 0.64513 | 1      |
| 84  | 0.08293        | 0.1713   | 0.05916           | 0.00000 | 1.00000 | 1      |
| 85  | 0.02925        | 0.1473   | 0.05746           | 0.91488 | 0.08512 | 0      |
| 86  | 0.1155         | 0.1554   | 0.05661           | 0.00000 | 1.00000 | 1      |
| 87  | 0.02017        | 0.1799   | 0.06166           | 0.97986 | 0.02014 | 0      |
| 88  | 0.02068        | 0.1619   | 0.05584           | 0.97558 | 0.02442 | 0      |
| 89  | 0.0351         | 0.1562   | 0.0602            | 0.95530 | 0.04470 | 0      |
| 90  | 0.05266        | 0.1779   | 0.06639           | 0.95339 | 0.04661 | 0      |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 91  | 490  | 913535    | 1         | 16.69  | 20.2    | 107.1     | 857.6 | 0.07497    | 0.07112     | 0.03649   |
| 92  | 491  | 91376701  | 0         | 12.25  | 22.44   | 78.18     | 466.5 | 0.08192    | 0.052       | 0.01714   |
| 93  | 493  | 914062    | 1         | 18.01  | 20.56   | 118.4     | 1007  | 0.1001     | 0.1289      | 0.117     |
| 94  | 497  | 914366    | 0         | 12.65  | 18.17   | 82.69     | 485.6 | 0.1076     | 0.1334      | 0.08017   |
| 95  | 504  | 915143    | 1         | 23.09  | 19.83   | 152.1     | 1682  | 0.09342    | 0.1275      | 0.1676    |
| 96  | 505  | 915186    | 0         | 9.268  | 12.87   | 61.49     | 248.7 | 0.1634     | 0.2239      | 0.0973    |
| 97  | 508  | 91544002  | 0         | 11.06  | 17.12   | 71.25     | 366.5 | 0.1194     | 0.1071      | 0.04063   |
| 98  | 512  | 915664    | 0         | 14.81  | 14.7    | 94.66     | 680.7 | 0.08472    | 0.05016     | 0.03416   |
| 99  | 516  | 916221    | 0         | 11.34  | 18.61   | 72.76     | 391.2 | 0.1049     | 0.08499     | 0.04302   |
| 100 | 517  | 916799    | 1         | 18.31  | 20.58   | 120.8     | 1052  | 0.1068     | 0.1248      | 0.1569    |
| 101 | 519  | 917062    | 0         | 12.88  | 18.22   | 84.45     | 493.1 | 0.1218     | 0.1661      | 0.04825   |
| 102 | 522  | 91762702  | 1         | 24.63  | 21.6    | 165.5     | 1841  | 0.103      | 0.2106      | 0.231     |
| 103 | 523  | 91789     | 0         | 11.26  | 19.83   | 71.3      | 388.1 | 0.08511    | 0.04413     | 0.005067  |
| 104 | 525  | 917897    | 0         | 9.847  | 15.68   | 63        | 293.2 | 0.09492    | 0.08419     | 0.0233    |
| 105 | 528  | 91813702  | 0         | 12.34  | 12.27   | 78.94     | 468.5 | 0.09003    | 0.06307     | 0.02958   |
| 106 | 530  | 918465    | 0         | 12.07  | 13.44   | 77.83     | 445.2 | 0.11       | 0.09009     | 0.03781   |
| 107 | 531  | 91858     | 0         | 11.75  | 17.56   | 75.89     | 422.9 | 0.1073     | 0.09713     | 0.05282   |
| 108 | 540  | 921362    | 0         | 7.691  | 25.44   | 48.34     | 170.4 | 0.08668    | 0.1199      | 0.09252   |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 91  | 0.02307        | 0.1846   | 0.05325           | 0.00051 | 0.99949 | 1      |
| 92  | 0.01261        | 0.1544   | 0.05976           | 0.99960 | 0.00040 | 0      |
| 93  | 0.07762        | 0.2116   | 0.06077           | 0.00000 | 1.00000 | 1      |
| 94  | 0.05074        | 0.1641   | 0.06854           | 0.98347 | 0.01653 | 0      |
| 95  | 0.1003         | 0.1505   | 0.05484           | 0.00000 | 1.00000 | 1      |
| 96  | 0.05252        | 0.2378   | 0.09502           | 0.99997 | 0.00003 | 0      |
| 97  | 0.04268        | 0.1954   | 0.07976           | 0.96174 | 0.03826 | 0      |
| 98  | 0.02541        | 0.1659   | 0.05348           | 0.99520 | 0.00480 | 0      |
| 99  | 0.02594        | 0.1927   | 0.06211           | 0.99936 | 0.00064 | 0      |
| 100 | 0.09451        | 0.186    | 0.05941           | 0.00000 | 1.00000 | 1      |
| 101 | 0.05303        | 0.1709   | 0.07253           | 0.99445 | 0.00555 | 0      |
| 102 | 0.1471         | 0.1991   | 0.06739           | 0.00000 | 1.00000 | 1      |
| 103 | 0.005664       | 0.1637   | 0.06343           | 0.99994 | 0.00006 | 0      |
| 104 | 0.02416        | 0.1387   | 0.06891           | 1.00000 | 0.00000 | 0      |
| 105 | 0.02647        | 0.1689   | 0.05808           | 0.99987 | 0.00013 | 0      |
| 106 | 0.02798        | 0.1657   | 0.06608           | 0.99984 | 0.00016 | 0      |
| 107 | 0.0444         | 0.1598   | 0.06677           | 0.99617 | 0.00383 | 0      |
| 108 | 0.01364        | 0.2037   | 0.07751           | 0.99996 | 0.00004 | 0      |

| Obs | VAR1 | ID_number | diagnosis | radius | texture | perimeter | area  | smoothness | compactness | concavity |
|-----|------|-----------|-----------|--------|---------|-----------|-------|------------|-------------|-----------|
| 109 | 544  | 922296    | 0         | 13.21  | 28.06   | 84.88     | 538.4 | 0.08671    | 0.06877     | 0.02987   |
| 110 | 545  | 922297    | 0         | 13.87  | 20.7    | 89.77     | 584.8 | 0.09578    | 0.1018      | 0.03688   |
| 111 | 547  | 922577    | 0         | 10.32  | 16.35   | 65.31     | 324.9 | 0.09434    | 0.04994     | 0.01012   |
| 112 | 553  | 924084    | 0         | 12.77  | 29.43   | 81.35     | 507.9 | 0.08276    | 0.04234     | 0.01997   |
| 113 | 558  | 925236    | 0         | 9.423  | 27.88   | 59.26     | 271.3 | 0.08123    | 0.04971     | 0         |
| 114 | 559  | 925277    | 0         | 14.59  | 22.68   | 96.39     | 657.1 | 0.08473    | 0.133       | 0.1029    |

| Obs | concave_points | symmetry | fractal_dimension | 0       | 1       | _INTO_ |
|-----|----------------|----------|-------------------|---------|---------|--------|
| 109 | 0.03275        | 0.1628   | 0.05781           | 0.96315 | 0.03685 | 0      |
| 110 | 0.02369        | 0.162    | 0.06688           | 0.98885 | 0.01115 | 0      |
| 111 | 0.005495       | 0.1885   | 0.06201           | 0.99999 | 0.00001 | 0      |
| 112 | 0.01499        | 0.1539   | 0.05637           | 0.98203 | 0.01797 | 0      |
| 113 | 0              | 0.1742   | 0.06059           | 1.00000 | 0.00000 | 0      |
| 114 | 0.03736        | 0.1454   | 0.06147           | 0.06058 | 0.93942 | 1      |