In [505]:
```
import numpy as np
import pandas as pd
import os
import fnmatch
from scikit_posthocs import posthoc_dunn
import scikit_posthocs as ph
```

In [506]:
```
workspace = '/home/phnarloch/Documentos/Source/sampling-covid-main'

column_names = ['run',
                'accuracy_score',
                'f1_score',
                'f1_score_macro',
                'f1_score_micro',
                'precision_score',
                'roc_auc_score',
                'recall_score',
                'balanced_accuracy_score',
                'specificity',
                'sensitivity',
                'TN',
                'FP',
                'FN',
                'TP',
                'DOR',
                'LR_P',
                'LR_N']

methods = {'ADASYN': 'ADASYN-RESULTADOS',
           'ROS': 'ROS-RESULTADOS',
           'RUS': 'RUS-RESULTADOS',
           'SMOTE': 'SMOTE-RESULTADOS',
           'SMOTETomek': 'SMOTETomek-RESULTADOS',
           'ORIGINAL': 'ORIGINAL-RESULTADOS'}
```

In [507]:
```
def get_dict(key):
    value = methods[key]
    method_path = f'{file_path}/{value}'
    _dict = {}
    for f in os.listdir(method_path):
        if not fnmatch.fnmatch(f, f'*{key}*'): #Getting only the CSVs
            continue
        #Each DataFrame will represent one Algorithm
        _df = pd.read_csv(f'{method_path}/{f}', header=None, names=column_names)
        _dict[f.split(sep='-')[0]] = _df
    return _dict
```

In [508]:
```
def get_p_df(_dict, metric_id):
    _ = pd.DataFrame(columns=['Algorithm', metric_id])
    n_df = pd.DataFrame()
    for key, value in _dict.items():
        n_df = n_df.assign(**{'Algorithm':pd.Series(np.full(30, key, dtype='S2'), dtype=str).values,
                         metric_id:value[metric_id]})

        _ = _.append(n_df)


    p_df = posthoc_dunn(_, val_col=str(metric_id), group_col='Algorithm', p_adjust = 'bonferroni')
    return p_df
```

ALBERT EINSTEIN DataSet

ADASYN

F1-Score

In [509]:
```
dataset = 'AE'
file_path = f'{workspace}/{dataset}'

_dict = get_dict('ADASYN')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[509]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.000356e-03	8.482192e-05	1.000000e+00	1.140870e-01	1.000000e+00	6.179957e-08	1.000000e+00
b'KN'	3.000356e-03	-1.000000e+00	3.674266e-16	8.864209e-03	1.000000e+00	1.771357e-07	1.815734e-21	8.007065e-04
b'LR'	8.482192e-05	3.674266e-16	-1.000000e+00	2.173252e-05	1.304343e-12	1.748167e-01	1.000000e+00	3.671039e-04
b'ML'	1.000000e+00	8.864209e-03	2.173252e-05	-1.000000e+00	2.611145e-01	7.656662e-01	1.118562e-08	1.000000e+00
b'NB'	1.140870e-01	1.000000e+00	1.304343e-12	2.611145e-01	-1.000000e+00	4.301996e-05	2.361864e-17	4.082544e-02
b'RF'	1.000000e+00	1.771357e-07	1.748167e-01	7.656662e-01	4.301996e-05	-1.000000e+00	1.448416e-03	1.000000e+00
b'SV'	6.179957e-08	1.815734e-21	1.000000e+00	1.118562e-08	2.361864e-17	1.448416e-03	-1.000000e+00	3.970261e-07
b'XG'	1.000000e+00	8.007065e-04	3.671039e-04	1.000000e+00	4.082544e-02	1.000000e+00	3.970261e-07	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [510]:
```
ph.sign_table(p_df)
```

Out[510]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	***	NS	NS	NS	***	NS
b'KN'	**	-	***	**	NS	***	***	***
b'LR'	***	***	-	***	***	NS	NS	***
b'ML'	NS	**	***	-	NS	NS	***	NS
b'NB'	NS	NS	***	NS	-	***	***	*
b'RF'	NS	***	NS	NS	***	-	**	NS
b'SV'	***	***	NS	***	***	**	-	***
b'XG'	NS	***	***	NS	*	NS	***	-

Sensitivity

In [511]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[511]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	7.006937e-04	8.130965e-02	1.783767e-11	1.244512e-01	7.861231e-04	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	7.871528e-09	1.000000e+00	4.461332e-19	2.198515e-05	9.310454e-09	1.000000e+00
b'LR'	7.006937e-04	7.871528e-09	-1.000000e+00	1.783767e-11	8.130965e-02	1.000000e+00	1.000000e+00	2.834596e-04
b'ML'	8.130965e-02	1.000000e+00	1.783767e-11	-1.000000e+00	7.554632e-23	1.623500e-07	2.157966e-11	1.532445e-01
b'NB'	1.783767e-11	4.461332e-19	8.130965e-02	7.554632e-23	-1.000000e+00	3.854487e-04	7.466417e-02	4.042291e-12
b'RF'	1.244512e-01	2.198515e-05	1.000000e+00	1.623500e-07	3.854487e-04	-1.000000e+00	1.000000e+00	6.521829e-02
b'SV'	7.861231e-04	9.310454e-09	1.000000e+00	2.157966e-11	7.466417e-02	1.000000e+00	-1.000000e+00	3.196100e-04
b'XG'	1.000000e+00	1.000000e+00	2.834596e-04	1.532445e-01	4.042291e-12	6.521829e-02	3.196100e-04	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [512]:
```
ph.sign_table(p_df)
```

Out[512]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	***	NS
b'KN'	NS	-	***	NS	***	***	***	NS
b'LR'	***	***	-	***	NS	NS	NS	***
b'ML'	NS	NS	***	-	***	***	***	NS
b'NB'	***	***	NS	***	-	***	NS	***
b'RF'	NS	***	NS	***	***	-	NS	NS
b'SV'	***	***	NS	***	NS	NS	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

Specificity

In [513]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[513]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	8.070363e-02	1.000000e+00	6.899348e-05	3.889310e-08	1.000000e+00	6.948323e-02	1.000000e+00
b'KN'	8.070363e-02	-1.000000e+00	9.031375e-03	1.102802e-13	5.860129e-02	1.000000e+00	5.337343e-08	9.161094e-02
b'LR'	1.000000e+00	9.031375e-03	-1.000000e+00	1.545804e-04	7.007753e-10	1.000000e+00	4.477458e-01	1.000000e+00
b'ML'	6.899348e-05	1.102802e-13	1.545804e-04	-1.000000e+00	9.404995e-28	1.499578e-09	9.176962e-01	5.596161e-06
b'NB'	3.889310e-08	5.860129e-02	7.007753e-10	9.404995e-28	-1.000000e+00	9.007423e-05	2.975771e-18	4.953776e-08
b'RF'	1.000000e+00	1.000000e+00	1.000000e+00	1.499578e-09	9.007423e-05	-1.000000e+00	2.689547e-04	1.000000e+00
b'SV'	6.948323e-02	5.337343e-08	4.477458e-01	9.176962e-01	2.975771e-18	2.689547e-04	-1.000000e+00	6.102210e-02
b'XG'	1.000000e+00	9.161094e-02	1.000000e+00	5.596161e-06	4.953776e-08	1.000000e+00	6.102210e-02	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [514]:
```
ph.sign_table(p_df)
```

Out[514]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	***	NS	NS	NS
b'KN'	NS	-	**	***	NS	NS	***	NS
b'LR'	NS	**	-	***	***	NS	NS	NS
b'ML'	***	***	***	-	***	***	NS	***
b'NB'	***	NS	***	***	-	***	***	***
b'RF'	NS	NS	NS	***	***	-	***	NS
b'SV'	NS	***	NS	NS	***	***	-	NS
b'XG'	NS	NS	NS	***	***	NS	NS	-

LR+

In [515]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[515]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	7.234531e-02	2.267419e-01	5.665360e-05	1.595416e-05	1.000000	1.295583e-05	1.000000
b'KN'	0.072345	-1.000000e+00	4.206092e-07	2.296294e-13	1.000000e+00	0.048707	2.234163e-14	0.023326
b'LR'	0.226742	4.206092e-07	-1.000000e+00	9.927493e-01	5.665011e-13	0.319485	4.676536e-01	0.569918
b'ML'	0.000057	2.296294e-13	9.927493e-01	-1.000000e+00	5.051220e-21	0.000101	1.000000e+00	0.000273
b'NB'	0.000016	1.000000e+00	5.665011e-13	5.051220e-21	-1.000000e+00	0.000009	2.779884e-22	0.000003
b'RF'	1.000000	4.870719e-02	3.194846e-01	1.009137e-04	8.588443e-06	-1.000000	2.385337e-05	1.000000
b'SV'	0.000013	2.234163e-14	4.676536e-01	1.000000e+00	2.779884e-22	0.000024	-1.000000e+00	0.000068
b'XG'	1.000000	2.332643e-02	5.699177e-01	2.727114e-04	2.759207e-06	1.000000	6.836084e-05	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [516]:
```
ph.sign_table(p_df)
```

Out[516]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	***	NS	***	NS
b'KN'	NS	-	***	***	NS	*	***	*
b'LR'	NS	***	-	NS	***	NS	NS	NS
b'ML'	***	***	NS	-	***	***	NS	***
b'NB'	***	NS	***	***	-	***	***	***
b'RF'	NS	*	NS	***	***	-	***	NS
b'SV'	***	***	NS	NS	***	***	-	***
b'XG'	NS	*	NS	***	***	NS	***	-

LR-

In [517]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

Out[517]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	2.356250e-01	2.377747e-06	8.109272e-01	8.312228e-05	4.688872e-02	1.710041e-07	1.000000e+00
b'KN'	2.356250e-01	-1.000000e+00	3.738879e-14	1.000000e+00	7.596749e-12	2.122515e-07	8.245353e-16	2.286204e-01
b'LR'	2.377747e-06	3.738879e-14	-1.000000e+00	1.312307e-12	1.000000e+00	7.516682e-01	1.000000e+00	2.516021e-06
b'ML'	8.109272e-01	1.000000e+00	1.312307e-12	-1.000000e+00	1.969219e-10	2.801932e-06	3.546511e-14	7.901185e-01
b'NB'	8.312228e-05	7.596749e-12	1.000000e+00	1.969219e-10	-1.000000e+00	1.000000e+00	1.000000e+00	8.736351e-05
b'RF'	4.688872e-02	2.122515e-07	7.516682e-01	2.801932e-06	1.000000e+00	-1.000000e+00	2.116243e-01	4.855341e-02
b'SV'	1.710041e-07	8.245353e-16	1.000000e+00	3.546511e-14	1.000000e+00	2.116243e-01	-1.000000e+00	1.817740e-07
b'XG'	1.000000e+00	2.286204e-01	2.516021e-06	7.901185e-01	8.736351e-05	4.855341e-02	1.817740e-07	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [518]:
```
ph.sign_table(p_df)
```

Out[518]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	*	***	NS
b'KN'	NS	-	***	NS	***	***	***	NS
b'LR'	***	***	-	***	NS	NS	NS	***
b'ML'	NS	NS	***	-	***	***	***	NS
b'NB'	***	***	NS	***	-	NS	NS	***
b'RF'	*	***	NS	***	NS	-	NS	*
b'SV'	***	***	NS	***	NS	NS	-	***
b'XG'	NS	NS	***	NS	***	*	***	-

DOR

In [519]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```

Out[519]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.343274e-03	1.604542e-06	1.000000e+00	1.000000e+00	2.292494e-01	3.723641e-09	1.000000e+00
b'KN'	3.343274e-03	-1.000000e+00	5.003182e-19	5.537919e-09	6.922333e-03	2.378207e-09	2.664143e-23	9.558768e-04
b'LR'	1.604542e-06	5.003182e-19	-1.000000e+00	7.883786e-07	5.689888e-07	1.509100e-01	1.000000e+00	8.094741e-06
b'ML'	1.000000e+00	5.537919e-09	7.883786e-07	-1.000000e+00	1.000000e+00	1.570748e-01	1.619326e-09	1.000000e+00
b'NB'	1.000000e+00	6.922333e-03	5.689888e-07	1.000000e+00	-1.000000e+00	1.317787e-01	1.105940e-09	1.000000e+00
b'RF'	2.292494e-01	2.378207e-09	1.509100e-01	1.570748e-01	1.317787e-01	-1.000000e+00	4.400429e-03	5.289897e-01
b'SV'	3.723641e-09	2.664143e-23	1.000000e+00	1.619326e-09	1.105940e-09	4.400429e-03	-1.000000e+00	2.505514e-08
b'XG'	1.000000e+00	9.558768e-04	8.094741e-06	1.000000e+00	1.000000e+00	5.289897e-01	2.505514e-08	-1.000000e+00

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [520]:
```
ph.sign_table(p_df)
```

Out[520]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	***	NS	NS	NS	***	NS
b'KN'	**	-	***	***	**	***	***	***
b'LR'	***	***	-	***	***	NS	NS	***
b'ML'	NS	***	***	-	NS	NS	***	NS
b'NB'	NS	**	***	NS	-	NS	***	NS
b'RF'	NS	***	NS	NS	NS	-	**	NS
b'SV'	***	***	NS	***	***	**	-	***
b'XG'	NS	***	***	NS	NS	NS	***	-

ORIGINAL

F1-Score

In [521]:
```
_dict = get_dict('ORIGINAL')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[521]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.126065	0.000364	1.173797e-12	3.489146e-10	1.000000e+00	1.780068e-13	9.182210e-06
b'KN'	1.260652e-01	-1.000000	1.000000	6.792823e-05	2.338039e-03	2.411507e-03	2.014775e-05	6.566350e-01
b'LR'	3.641993e-04	1.000000	-1.000000	3.916553e-02	4.408576e-01	1.442182e-06	1.649007e-02	1.000000e+00
b'ML'	1.173797e-12	0.000068	0.039166	-1.000000e+00	1.000000e+00	1.561138e-16	1.000000e+00	4.019463e-01
b'NB'	3.489146e-10	0.002338	0.440858	1.000000e+00	-1.000000e+00	1.068681e-13	1.000000e+00	1.000000e+00
b'RF'	1.000000e+00	0.002412	0.000001	1.561138e-16	1.068681e-13	-1.000000e+00	1.827332e-17	1.656135e-08
b'SV'	1.780068e-13	0.000020	0.016490	1.000000e+00	1.000000e+00	1.827332e-17	-1.000000e+00	2.000621e-01
b'XG'	9.182210e-06	0.656635	1.000000	4.019463e-01	1.000000e+00	1.656135e-08	2.000621e-01	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [522]:
```
ph.sign_table(p_df)
```

Out[522]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	***	***	NS	***	***
b'KN'	NS	-	NS	***	**	**	***	NS
b'LR'	***	NS	-	*	NS	***	*	NS
b'ML'	***	***	*	-	NS	***	NS	NS
b'NB'	***	**	NS	NS	-	***	NS	NS
b'RF'	NS	**	***	***	***	-	***	***
b'SV'	***	***	*	NS	NS	***	-	NS
b'XG'	***	NS	NS	NS	NS	***	NS	-

Sensitivity

In [523]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[523]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	3.374583e-01	3.843081e-07	1.864482e-18	8.818623e-01	2.764921e-06	6.195059e-05
b'KN'	1.000000e+00	-1.000000e+00	1.000000e+00	6.977048e-05	8.994203e-15	5.085487e-02	3.624604e-04	4.663491e-03
b'LR'	3.374583e-01	1.000000e+00	-1.000000e+00	4.324962e-02	9.892462e-10	8.794841e-05	1.351388e-01	7.352519e-01
b'ML'	3.843081e-07	6.977048e-05	4.324962e-02	-1.000000e+00	1.533515e-02	1.393002e-13	1.000000e+00	1.000000e+00
b'NB'	1.864482e-18	8.994203e-15	9.892462e-10	1.533515e-02	-1.000000e+00	4.416689e-28	3.985820e-03	3.029816e-04
b'RF'	8.818623e-01	5.085487e-02	8.794841e-05	1.393002e-13	4.416689e-28	-1.000000e+00	2.084596e-12	1.632476e-10
b'SV'	2.764921e-06	3.624604e-04	1.351388e-01	1.000000e+00	3.985820e-03	2.084596e-12	-1.000000e+00	1.000000e+00
b'XG'	6.195059e-05	4.663491e-03	7.352519e-01	1.000000e+00	3.029816e-04	1.632476e-10	1.000000e+00	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [524]:
```
ph.sign_table(p_df)
```

Out[524]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	***	NS	***	***
b'KN'	NS	-	NS	***	***	NS	***	**
b'LR'	NS	NS	-	*	***	***	NS	NS
b'ML'	***	***	*	-	*	***	NS	NS
b'NB'	***	***	***	*	-	***	**	***
b'RF'	NS	NS	***	***	***	-	***	***
b'SV'	***	***	NS	NS	**	***	-	NS
b'XG'	***	**	NS	NS	***	***	NS	-

Specificity

In [525]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[525]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.025470e-02	6.906691e-01	1.000000e+00	1.776506e-05	1.651092e-09	1.000000e+00	1.000000e+00
b'KN'	1.025470e-02	-1.000000e+00	1.000000e+00	5.191568e-03	3.639544e-16	7.991107e-02	7.493468e-01	1.001813e-05
b'LR'	6.906691e-01	1.000000e+00	-1.000000e+00	4.329053e-01	1.382571e-11	4.787753e-04	1.000000e+00	4.508345e-03
b'ML'	1.000000e+00	5.191568e-03	4.329053e-01	-1.000000e+00	4.320012e-05	5.048338e-10	1.000000e+00	1.000000e+00
b'NB'	1.776506e-05	3.639544e-16	1.382571e-11	4.320012e-05	-1.000000e+00	2.708315e-29	6.920771e-09	1.549059e-02
b'RF'	1.651092e-09	7.991107e-02	4.787753e-04	5.048338e-10	2.708315e-29	-1.000000e+00	5.640118e-06	1.917592e-14
b'SV'	1.000000e+00	7.493468e-01	1.000000e+00	1.000000e+00	6.920771e-09	5.640118e-06	-1.000000e+00	1.130637e-01
b'XG'	1.000000e+00	1.001813e-05	4.508345e-03	1.000000e+00	1.549059e-02	1.917592e-14	1.130637e-01	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [526]:
```
ph.sign_table(p_df)
```

Out[526]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	NS	NS	***	***	NS	NS
b'KN'	*	-	NS	**	***	NS	NS	***
b'LR'	NS	NS	-	NS	***	***	NS	**
b'ML'	NS	**	NS	-	***	***	NS	NS
b'NB'	***	***	***	***	-	***	***	*
b'RF'	***	NS	***	***	***	-	***	***
b'SV'	NS	NS	NS	NS	***	***	-	NS
b'XG'	NS	***	**	NS	*	***	NS	-

LR+

In [527]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[527]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	2.341376e-06	2.225573e-04	2.025123e-02	1.138613e-01	4.356370e-12	2.057768e-05	1.000000e+00
b'KN'	2.341376e-06	-1.000000e+00	1.000000e+00	1.000000e+00	5.151080e-15	1.000000e+00	1.000000e+00	9.291077e-04
b'LR'	2.225573e-04	1.000000e+00	-1.000000e+00	1.000000e+00	6.001869e-12	9.936092e-02	1.000000e+00	3.142951e-02
b'ML'	2.025123e-02	1.000000e+00	1.000000e+00	-1.000000e+00	1.123319e-08	1.760988e-03	1.000000e+00	8.361289e-01
b'NB'	1.138613e-01	5.151080e-15	6.001869e-12	1.123319e-08	-1.000000e+00	3.138304e-23	1.423020e-13	1.252098e-03
b'RF'	4.356370e-12	1.000000e+00	9.936092e-02	1.760988e-03	3.138304e-23	-1.000000e+00	4.223093e-01	1.868988e-08
b'SV'	2.057768e-05	1.000000e+00	1.000000e+00	1.000000e+00	1.423020e-13	4.223093e-01	-1.000000e+00	5.087083e-03
b'XG'	1.000000e+00	9.291077e-04	3.142951e-02	8.361289e-01	1.252098e-03	1.868988e-08	5.087083e-03	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [528]:
```
ph.sign_table(p_df)
```

Out[528]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	*	NS	***	***	NS
b'KN'	***	-	NS	NS	***	NS	NS	***
b'LR'	***	NS	-	NS	***	NS	NS	*
b'ML'	*	NS	NS	-	***	**	NS	NS
b'NB'	NS	***	***	***	-	***	***	**
b'RF'	***	NS	NS	**	***	-	NS	***
b'SV'	***	NS	NS	NS	***	NS	-	**
b'XG'	NS	***	*	NS	**	***	**	-

LR-

In [529]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

Out[529]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.828989e-02	1.136779e-08	6.586579e-21	1.000000e+00	2.053254e-08	3.036445e-05
b'KN'	1.000000e+00	-1.000000e+00	1.000000e+00	5.306484e-04	2.563296e-13	1.708209e-02	8.022699e-04	1.042021e-01
b'LR'	1.828989e-02	1.000000e+00	-1.000000e+00	1.250541e-01	7.477484e-09	3.273788e-05	1.667496e-01	1.000000e+00
b'ML'	1.136779e-08	5.306484e-04	1.250541e-01	-1.000000e+00	1.437962e-02	3.692661e-13	1.000000e+00	1.000000e+00
b'NB'	6.586579e-21	2.563296e-13	7.477484e-09	1.437962e-02	-1.000000e+00	1.470147e-27	1.012757e-02	3.463407e-05
b'RF'	1.000000e+00	1.708209e-02	3.273788e-05	3.692661e-13	1.470147e-27	-1.000000e+00	7.614623e-13	6.956463e-09
b'SV'	2.053254e-08	8.022699e-04	1.667496e-01	1.000000e+00	1.012757e-02	7.614623e-13	-1.000000e+00	1.000000e+00
b'XG'	3.036445e-05	1.042021e-01	1.000000e+00	1.000000e+00	3.463407e-05	6.956463e-09	1.000000e+00	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [530]:
```
ph.sign_table(p_df)
```

Out[530]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	***	***	NS	***	***
b'KN'	NS	-	NS	***	***	*	***	NS
b'LR'	*	NS	-	NS	***	***	NS	NS
b'ML'	***	***	NS	-	*	***	NS	NS
b'NB'	***	***	***	*	-	***	*	***
b'RF'	NS	*	***	***	***	-	***	***
b'SV'	***	***	NS	NS	*	***	-	NS
b'XG'	***	NS	NS	NS	***	***	NS	-

DOR

In [531]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```

Out[531]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.982456e-09	1.660191e-09	2.315219e-12	1.000000e+00	0.000021	4.984679e-16	0.000675
b'KN'	3.982456e-09	-1.000000e+00	1.000000e+00	1.000000e+00	1.006118e-06	1.000000	1.000000e+00	0.797634
b'LR'	1.660191e-09	1.000000e+00	-1.000000e+00	1.000000e+00	4.712328e-07	1.000000	1.000000e+00	0.565708
b'ML'	2.315219e-12	1.000000e+00	1.000000e+00	-1.000000e+00	1.484091e-09	0.328921	1.000000e+00	0.033118
b'NB'	1.000000e+00	1.006118e-06	4.712328e-07	1.484091e-09	-1.000000e+00	0.001480	8.065541e-13	0.025273
b'RF'	2.117594e-05	1.000000e+00	1.000000e+00	3.289208e-01	1.480151e-03	-1.000000	1.034522e-02	1.000000
b'SV'	4.984679e-16	1.000000e+00	1.000000e+00	1.000000e+00	8.065541e-13	0.010345	-1.000000e+00	0.000513
b'XG'	6.750912e-04	7.976343e-01	5.657078e-01	3.311756e-02	2.527330e-02	1.000000	5.132045e-04	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [532]:
```
ph.sign_table(p_df)
```

Out[532]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	NS	***	***	***
b'KN'	***	-	NS	NS	***	NS	NS	NS
b'LR'	***	NS	-	NS	***	NS	NS	NS
b'ML'	***	NS	NS	-	***	NS	NS	*
b'NB'	NS	***	***	***	-	**	***	*
b'RF'	***	NS	NS	NS	**	-	*	NS
b'SV'	***	NS	NS	NS	***	*	-	***
b'XG'	***	NS	NS	*	*	NS	***	-

ROS

F1-Score

In [533]:
```
_dict = get_dict('ROS')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[533]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.613717e-05	1.156744e-09	1.000000e+00	1.000000e+00	0.000219	4.302282e-13	1.000000e+00
b'KN'	1.613717e-05	-1.000000e+00	1.000000e+00	3.047337e-02	1.601925e-07	1.000000	2.028000e-01	1.746992e-02
b'LR'	1.156744e-09	1.000000e+00	-1.000000e+00	3.173443e-05	3.157401e-12	0.930183	1.000000e+00	1.437025e-05
b'ML'	1.000000e+00	3.047337e-02	3.173443e-05	-1.000000e+00	2.947099e-01	0.173322	7.412124e-08	1.000000e+00
b'NB'	1.000000e+00	1.601925e-07	3.157401e-12	2.947099e-01	-1.000000e+00	0.000003	4.862682e-16	4.544225e-01
b'RF'	2.191286e-04	1.000000e+00	9.301835e-01	1.733219e-01	3.321277e-06	-1.000000	3.658006e-02	1.072182e-01
b'SV'	4.302282e-13	2.028000e-01	1.000000e+00	7.412124e-08	4.862682e-16	0.036580	-1.000000e+00	2.852197e-08
b'XG'	1.000000e+00	1.746992e-02	1.437025e-05	1.000000e+00	4.544225e-01	0.107218	2.852197e-08	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [534]:
```
ph.sign_table(p_df)
```

Out[534]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	NS	NS	***	***	NS
b'KN'	***	-	NS	*	***	NS	NS	*
b'LR'	***	NS	-	***	***	NS	NS	***
b'ML'	NS	*	***	-	NS	NS	***	NS
b'NB'	NS	***	***	NS	-	***	***	NS
b'RF'	***	NS	NS	NS	***	-	*	NS
b'SV'	***	NS	NS	***	***	*	-	***
b'XG'	NS	*	***	NS	NS	NS	***	-

Sensitivity

In [535]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[535]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.390192e-01	6.925892e-04	1.000000e+00	4.195348e-13	1.000000e+00	3.922112e-03	7.199913e-02
b'KN'	1.390192e-01	-1.000000e+00	1.000000e+00	5.720583e-05	2.994953e-05	1.000000e+00	1.000000e+00	1.607714e-07
b'LR'	6.925892e-04	1.000000e+00	-1.000000e+00	2.075532e-08	1.454720e-02	1.999054e-01	1.000000e+00	1.332494e-11
b'ML'	1.000000e+00	5.720583e-05	2.075532e-08	-1.000000e+00	1.713714e-20	1.474999e-02	2.530722e-07	1.000000e+00
b'NB'	4.195348e-13	2.994953e-05	1.454720e-02	1.713714e-20	-1.000000e+00	2.027357e-08	2.929124e-03	2.774380e-25
b'RF'	1.000000e+00	1.000000e+00	1.999054e-01	1.474999e-02	2.027357e-08	-1.000000e+00	6.311887e-01	1.562139e-04
b'SV'	3.922112e-03	1.000000e+00	1.000000e+00	2.530722e-07	2.929124e-03	6.311887e-01	-1.000000e+00	2.499127e-10
b'XG'	7.199913e-02	1.607714e-07	1.332494e-11	1.000000e+00	2.774380e-25	1.562139e-04	2.499127e-10	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [536]:
```
ph.sign_table(p_df)
```

Out[536]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	**	NS
b'KN'	NS	-	NS	***	***	NS	NS	***
b'LR'	***	NS	-	***	*	NS	NS	***
b'ML'	NS	***	***	-	***	*	***	NS
b'NB'	***	***	*	***	-	***	**	***
b'RF'	NS	NS	NS	*	***	-	NS	***
b'SV'	**	NS	NS	***	**	NS	-	***
b'XG'	NS	***	***	NS	***	***	***	-

Specificity

In [537]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[537]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.000000e+00	1.411463e-06	8.833456e-03	5.780811e-01	5.143775e-04	6.578796e-12
b'KN'	1.000000e+00	-1.000000e+00	1.000000e+00	1.077050e-04	2.606865e-04	1.000000e+00	1.549593e-02	2.296181e-09
b'LR'	1.000000e+00	1.000000e+00	-1.000000e+00	1.723820e-03	1.267372e-05	1.000000e+00	1.260423e-01	1.120625e-07
b'ML'	1.411463e-06	1.077050e-04	1.723820e-03	-1.000000e+00	3.926654e-18	4.804380e-02	1.000000e+00	1.000000e+00
b'NB'	8.833456e-03	2.606865e-04	1.267372e-05	3.926654e-18	-1.000000e+00	9.200046e-08	8.731735e-14	2.333190e-26
b'RF'	5.780811e-01	1.000000e+00	1.000000e+00	4.804380e-02	9.200046e-08	-1.000000e+00	1.000000e+00	1.501787e-05
b'SV'	5.143775e-04	1.549593e-02	1.260423e-01	1.000000e+00	8.731735e-14	1.000000e+00	-1.000000e+00	6.549698e-02
b'XG'	6.578796e-12	2.296181e-09	1.120625e-07	1.000000e+00	2.333190e-26	1.501787e-05	6.549698e-02	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [538]:
```
ph.sign_table(p_df)
```

Out[538]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	**	NS	***	***
b'KN'	NS	-	NS	***	***	NS	*	***
b'LR'	NS	NS	-	**	***	NS	NS	***
b'ML'	***	***	**	-	***	*	NS	NS
b'NB'	**	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	*	***	-	NS	***
b'SV'	***	*	NS	NS	***	NS	-	NS
b'XG'	***	***	***	NS	***	***	NS	-

LR+

In [539]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[539]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.789621e-01	1.456810e-03	2.296094e-03	1.165695e-01	1.661982e-02	2.545094e-09	2.476347e-08
b'KN'	1.789621e-01	-1.000000e+00	1.000000e+00	1.000000e+00	6.266553e-07	1.000000e+00	4.865672e-03	1.873075e-02
b'LR'	1.456810e-03	1.000000e+00	-1.000000e+00	1.000000e+00	1.339494e-10	1.000000e+00	4.169187e-01	1.000000e+00
b'ML'	2.296094e-03	1.000000e+00	1.000000e+00	-1.000000e+00	2.849246e-10	1.000000e+00	3.078254e-01	7.976285e-01
b'NB'	1.165695e-01	6.266553e-07	1.339494e-10	2.849246e-10	-1.000000e+00	8.330746e-09	2.527369e-19	6.644073e-18
b'RF'	1.661982e-02	1.000000e+00	1.000000e+00	1.000000e+00	8.330746e-09	-1.000000e+00	6.475571e-02	1.974149e-01
b'SV'	2.545094e-09	4.865672e-03	4.169187e-01	3.078254e-01	2.527369e-19	6.475571e-02	-1.000000e+00	1.000000e+00
b'XG'	2.476347e-08	1.873075e-02	1.000000e+00	7.976285e-01	6.644073e-18	1.974149e-01	1.000000e+00	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [540]:
```
ph.sign_table(p_df)
```

Out[540]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	**	NS	*	***	***
b'KN'	NS	-	NS	NS	***	NS	**	*
b'LR'	**	NS	-	NS	***	NS	NS	NS
b'ML'	**	NS	NS	-	***	NS	NS	NS
b'NB'	NS	***	***	***	-	***	***	***
b'RF'	*	NS	NS	NS	***	-	NS	NS
b'SV'	***	**	NS	NS	***	NS	-	NS
b'XG'	***	*	NS	NS	***	NS	NS	-

LR-

In [541]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

Out[541]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.008814	4.772614e-06	1.000000e+00	1.029061e-11	0.415849	2.329268e-06	1.000000e+00
b'KN'	8.813779e-03	-1.000000	1.000000e+00	1.561108e-04	6.947460e-03	1.000000	1.000000e+00	1.100461e-06
b'LR'	4.772614e-06	1.000000	-1.000000e+00	1.936017e-08	1.000000e+00	0.146220	1.000000e+00	3.019517e-11
b'ML'	1.000000e+00	0.000156	1.936017e-08	-1.000000e+00	6.399161e-15	0.020666	8.380864e-09	1.000000e+00
b'NB'	1.029061e-11	0.006947	1.000000e+00	6.399161e-15	-1.000000e+00	0.000038	1.000000e+00	1.478277e-18
b'RF'	4.158486e-01	1.000000	1.462195e-01	2.066590e-02	3.803022e-05	-1.000000	9.672735e-02	4.230224e-04
b'SV'	2.329268e-06	1.000000	1.000000e+00	8.380864e-09	1.000000e+00	0.096727	-1.000000e+00	1.156601e-11
b'XG'	1.000000e+00	0.000001	3.019517e-11	1.000000e+00	1.478277e-18	0.000423	1.156601e-11	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [542]:
```
ph.sign_table(p_df)
```

Out[542]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	***	NS	***	NS	***	NS
b'KN'	**	-	NS	***	**	NS	NS	***
b'LR'	***	NS	-	***	NS	NS	NS	***
b'ML'	NS	***	***	-	***	*	***	NS
b'NB'	***	**	NS	***	-	***	NS	***
b'RF'	NS	NS	NS	*	***	-	NS	***
b'SV'	***	NS	NS	***	NS	NS	-	***
b'XG'	NS	***	***	NS	***	***	***	-

DOR

In [543]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[543]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000009	9.514630e-11	1.000000e+00	1.000000e+00	0.000213	4.092671e-14	1.000000e+00
b'KN'	8.716314e-06	-1.000000	1.000000e+00	2.233099e-02	5.542139e-02	1.000000	1.172560e-01	3.051483e-02
b'LR'	9.514630e-11	1.000000	-1.000000e+00	5.659725e-06	2.220972e-05	0.363436	1.000000e+00	9.021992e-06
b'ML'	1.000000e+00	0.022331	5.659725e-06	-1.000000e+00	1.000000e+00	0.186672	1.416071e-08	1.000000e+00
b'NB'	1.000000e+00	0.055421	2.220972e-05	1.000000e+00	-1.000000e+00	0.396697	7.194362e-08	1.000000e+00
b'RF'	2.130817e-04	1.000000	3.634355e-01	1.866715e-01	3.969968e-01	-1.000000	1.282010e-02	2.421574e-01
b'SV'	4.092671e-14	0.117256	1.000000e+00	1.416071e-08	7.194362e-08	0.012820	-1.000000e+00	2.461918e-08
b'XG'	1.000000e+00	0.030515	9.021992e-06	1.000000e+00	1.000000e+00	0.242157	2.461918e-08	-1.000000e+00

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [544]:
```
ph.sign_table(p_df)
```
Out[544]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	NS	NS	***	***	NS
b'KN'	***	-	NS	*	NS	NS	NS	*
b'LR'	***	NS	-	***	***	NS	NS	***
b'ML'	NS	*	***	-	NS	NS	***	NS
b'NB'	NS	NS	***	NS	-	NS	***	NS
b'RF'	***	NS	NS	NS	NS	-	*	NS
b'SV'	***	NS	NS	***	***	*	-	***
b'XG'	NS	*	***	NS	NS	NS	***	-

RUS

F1-Score

In [545]:
```
_dict = get_dict('RUS')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[545]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	2.874061e-05	1.262480e-09	5.435029e-09	1.000000e+00	0.043240	6.736066e-13	0.337411
b'KN'	2.874061e-05	-1.000000e+00	1.000000e+00	1.000000e+00	1.838131e-08	1.000000	1.718494e-01	0.490262
b'LR'	1.262480e-09	1.000000e+00	-1.000000e+00	1.000000e+00	9.460998e-14	0.017528	1.000000e+00	0.001285
b'ML'	5.435029e-09	1.000000e+00	1.000000e+00	-1.000000e+00	5.384617e-13	0.038519	1.000000e+00	0.003237
b'NB'	1.000000e+00	1.838131e-08	9.460998e-14	5.384617e-13	-1.000000e+00	0.000234	1.346529e-17	0.004045
b'RF'	4.324032e-02	1.000000e+00	1.752850e-02	3.851933e-02	2.338455e-04	-1.000000	2.288290e-04	1.000000
b'SV'	6.736066e-13	1.718494e-01	1.000000e+00	1.000000e+00	1.346529e-17	0.000229	-1.000000e+00	0.000009
b'XG'	3.374109e-01	4.902624e-01	1.284826e-03	3.236907e-03	4.044900e-03	1.000000	8.730087e-06	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [546]:
```
ph.sign_table(p_df)
```
Out[546]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	NS	*	***	NS
b'KN'	***	-	NS	NS	***	NS	NS	NS
b'LR'	***	NS	-	NS	***	*	NS	**
b'ML'	***	NS	NS	-	***	*	NS	**
b'NB'	NS	***	***	***	-	***	***	**
b'RF'	*	NS	*	*	***	-	***	NS
b'SV'	***	NS	NS	NS	***	***	-	***
b'XG'	NS	NS	**	**	**	NS	***	-

Sensitivity

In [547]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[547]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.174102e-04	3.750854e-08	2.138615e-04	1.345026e-23	1.673578e-01	1.001780e-07	1.000000e+00
b'KN'	1.174102e-04	-1.000000e+00	1.000000e+00	1.000000e+00	2.726798e-07	1.000000e+00	1.000000e+00	1.631330e-01
b'LR'	3.750854e-08	1.000000e+00	-1.000000e+00	1.000000e+00	5.370776e-04	2.579458e-02	1.000000e+00	6.888747e-04
b'ML'	2.138615e-04	1.000000e+00	1.000000e+00	-1.000000e+00	1.282839e-07	1.000000e+00	1.000000e+00	2.384252e-01
b'NB'	1.345026e-23	2.726798e-07	5.370776e-04	1.282839e-07	-1.000000e+00	9.114128e-13	2.587966e-04	5.656486e-16
b'RF'	1.673578e-01	1.000000e+00	2.579458e-02	1.000000e+00	9.114128e-13	-1.000000e+00	4.515857e-02	1.000000e+00
b'SV'	1.001780e-07	1.000000e+00	1.000000e+00	1.000000e+00	2.587966e-04	4.515857e-02	-1.000000e+00	1.383147e-03
b'XG'	1.000000e+00	1.631330e-01	6.888747e-04	2.384252e-01	5.656486e-16	1.000000e+00	1.383147e-03	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [548]:
```
ph.sign_table(p_df)
```
Out[548]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	***	NS	***	NS
b'KN'	***	-	NS	NS	***	NS	NS	NS
b'LR'	***	NS	-	NS	***	*	NS	***
b'ML'	***	NS	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	*	NS	***	-	*	NS
b'SV'	***	NS	NS	NS	***	*	-	**
b'XG'	NS	NS	***	NS	***	NS	**	-

Specificity

In [549]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[549]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.000000e+00	3.259318e-01	7.699235e-08	1.000000	1.782133e-01	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	1.000000e+00	1.267013e-01	5.054351e-07	1.000000	6.524925e-02	1.000000e+00
b'LR'	1.000000e+00	1.000000e+00	-1.000000e+00	1.000000e+00	2.858116e-09	1.000000	7.581484e-01	1.000000e+00
b'ML'	3.259318e-01	1.267013e-01	1.000000e+00	-1.000000e+00	6.945530e-16	0.040929	1.000000e+00	1.000000e+00
b'NB'	7.699235e-08	5.054351e-07	2.858116e-09	6.945530e-16	-1.000000e+00	0.000003	1.165550e-16	4.386294e-09
b'RF'	1.000000e+00	1.000000e+00	1.000000e+00	4.092901e-02	3.489645e-06	-1.000000	1.973597e-02	1.000000e+00
b'SV'	1.782133e-01	6.524925e-02	7.581484e-01	1.000000e+00	1.165550e-16	0.019736	-1.000000e+00	6.405200e-01
b'XG'	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	4.386294e-09	1.000000	6.405200e-01	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [550]:
```
ph.sign_table(p_df)
```
Out[550]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	NS	NS	NS
b'KN'	NS	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	NS	NS	-	***	*	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	*	***	-	*	NS
b'SV'	NS	NS	NS	NS	***	*	-	NS
b'XG'	NS	NS	NS	NS	***	NS	NS	-

LR+

In [551]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[551]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	7.131269e-01	3.647255e-03	5.311622e-05	2.260762e-03	1.000000	7.474768e-07	1.000000e+00
b'KN'	7.131269e-01	-1.000000e+00	1.000000e+00	3.194836e-01	1.836173e-08	1.000000	2.452589e-02	1.000000e+00
b'LR'	3.647255e-03	1.000000e+00	-1.000000e+00	1.000000e+00	2.229823e-13	0.293392	1.000000e+00	7.234638e-01
b'ML'	5.311622e-05	3.194836e-01	1.000000e+00	-1.000000e+00	8.791838e-17	0.013137	1.000000e+00	4.316020e-02
b'NB'	2.260762e-03	1.836173e-08	2.229823e-13	8.791838e-17	-1.000000e+00	0.000005	5.654267e-20	8.492522e-07
b'RF'	1.000000e+00	1.000000e+00	2.933916e-01	1.313701e-02	5.329780e-06	-1.000000	4.880451e-04	1.000000e+00
b'SV'	7.474768e-07	2.452589e-02	1.000000e+00	1.000000e+00	5.654267e-20	0.000488	-1.000000e+00	2.059375e-03
b'XG'	1.000000e+00	1.000000e+00	7.234638e-01	4.316020e-02	8.492522e-07	1.000000	2.059375e-03	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [552]:
```
ph.sign_table(p_df)
```
Out[552]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	***	**	NS	***	NS
b'KN'	NS	-	NS	NS	***	NS	*	NS
b'LR'	**	NS	-	NS	***	NS	NS	NS
b'ML'	***	NS	NS	-	***	*	NS	*
b'NB'	**	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	*	***	-	***	NS
b'SV'	***	*	NS	NS	***	***	-	**
b'XG'	NS	NS	NS	*	***	NS	**	-

LR-

In [553]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[553]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000027	5.377220e-10	0.000001	1.670618e-19	1.017539e-01	8.118767e-11	1.000000e+00
b'KN'	2.672896e-05	-1.000000	1.000000e+00	1.000000	1.995955e-04	1.000000e+00	1.000000e+00	9.730658e-02
b'LR'	5.377220e-10	1.000000	-1.000000e+00	1.000000	2.069795e-01	3.992165e-03	1.000000e+00	6.181645e-05
b'ML'	1.308780e-06	1.000000	1.000000e+00	-1.000000	2.405212e-03	2.973392e-01	1.000000e+00	1.379293e-02
b'NB'	1.670618e-19	0.000200	2.069795e-01	0.002405	-1.000000e+00	2.529431e-09	4.490241e-01	3.481921e-12
b'RF'	1.017539e-01	1.000000	3.992165e-03	0.297339	2.529431e-09	-1.000000e+00	1.292757e-03	1.000000e+00
b'SV'	8.118767e-11	1.000000	1.000000e+00	1.000000	4.490241e-01	1.292757e-03	-1.000000e+00	1.572474e-05
b'XG'	1.000000e+00	0.097307	6.181645e-05	0.013793	3.481921e-12	1.000000e+00	1.572474e-05	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [554]:
```
ph.sign_table(p_df)
```
Out[554]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	***	NS	***	NS
b'KN'	***	-	NS	NS	***	NS	NS	NS
b'LR'	***	NS	-	NS	NS	**	NS	***
b'ML'	***	NS	NS	-	**	NS	NS	*
b'NB'	***	***	NS	**	-	***	NS	***
b'RF'	NS	NS	**	NS	***	-	**	NS
b'SV'	***	NS	NS	NS	NS	**	-	***
b'XG'	NS	NS	***	*	***	NS	***	-

DOR

In [555]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[555]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000004	3.978692e-11	4.085028e-10	1.000000e+00	0.027734	2.392196e-14	0.278812
b'KN'	4.041009e-06	-1.000000	1.000000e+00	1.000000e+00	3.565524e-03	1.000000	1.491860e-01	0.204692
b'LR'	3.978692e-11	1.000000	-1.000000e+00	1.000000e+00	4.392262e-07	0.004239	1.000000e+00	0.000186
b'ML'	4.085028e-10	1.000000	1.000000e+00	-1.000000e+00	2.845189e-06	0.015197	1.000000e+00	0.000836
b'NB'	1.000000e+00	0.003566	4.392262e-07	2.845189e-06	-1.000000e+00	1.000000	1.019167e-09	1.000000
b'RF'	2.773364e-02	1.000000	4.238927e-03	1.519739e-02	1.000000e+00	-1.000000	5.613426e-05	1.000000
b'SV'	2.392196e-14	0.149188	1.000000e+00	1.000000e+00	1.019167e-09	0.000056	-1.000000e+00	0.000001
b'XG'	2.788125e-01	0.204692	1.861122e-04	8.357226e-04	1.000000e+00	1.000000	1.268254e-06	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [556]:
```
ph.sign_table(p_df)
```
Out[556]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	NS	*	***	NS
b'KN'	***	-	NS	NS	**	NS	NS	NS
b'LR'	***	NS	-	NS	***	**	NS	***
b'ML'	***	NS	NS	-	***	*	NS	***
b'NB'	NS	**	***	***	-	NS	***	NS
b'RF'	*	NS	**	*	NS	-	***	NS
b'SV'	***	NS	NS	NS	***	***	-	***
b'XG'	NS	NS	***	***	NS	NS	***	-

SMOTE

F1-Score

In [557]:
```
_dict = get_dict('SMOTE')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[557]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	7.822031e-01	7.347137e-06	1.000000e+00	1.988522e-02	0.947602	7.893540e-08	1.000000
b'KN'	7.822031e-01	-1.000000e+00	5.683591e-12	3.473581e-01	1.000000e+00	0.000437	1.106918e-14	0.035418
b'LR'	7.347137e-06	5.683591e-12	-1.000000e+00	3.519779e-05	3.950065e-16	0.069229	1.000000e+00	0.001047
b'ML'	1.000000e+00	3.473581e-01	3.519779e-05	-1.000000e+00	6.333131e-03	1.000000	4.772640e-07	1.000000
b'NB'	1.988522e-02	1.000000e+00	3.950065e-16	6.333131e-03	-1.000000e+00	0.000001	3.037577e-19	0.000288
b'RF'	9.476025e-01	4.366356e-04	6.922911e-02	1.000000e+00	1.018790e-06	-1.000000	3.738764e-03	1.000000
b'SV'	7.893540e-08	1.106918e-14	1.000000e+00	4.772640e-07	3.037577e-19	0.003739	-1.000000e+00	0.000025
b'XG'	1.000000e+00	3.541791e-02	1.047141e-03	1.000000e+00	2.877708e-04	1.000000	2.471182e-05	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [558]:
```
ph.sign_table(p_df)
```
Out[558]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	*	NS	***	NS
b'KN'	NS	-	***	NS	NS	***	***	*
b'LR'	***	***	-	***	***	NS	NS	**
b'ML'	NS	NS	***	-	**	NS	***	NS
b'NB'	*	NS	***	**	-	***	***	***
b'RF'	NS	***	NS	NS	***	-	**	NS
b'SV'	***	***	NS	***	***	**	-	***
b'XG'	NS	*	**	NS	***	NS	***	-

Sensitivity

In [559]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[559]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	2.422298e-02	4.906618e-02	2.767337e-09	1.000000e+00	4.361970e-02	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	1.319420e-04	7.440632e-12	3.391322e-13	1.000000e+00	2.896814e-04	1.000000e+00
b'LR'	2.422298e-02	1.319420e-04	-1.000000e+00	2.924811e-09	4.768665e-02	3.719310e-03	1.000000e+00	1.313997e-05
b'ML'	4.906618e-02	7.440632e-12	2.924811e-09	-1.000000e+00	2.282236e-16	2.326888e-01	8.720876e-06	1.000000e+00
b'NB'	2.767337e-09	3.391322e-13	4.768665e-02	2.282236e-16	-1.000000e+00	9.608601e-11	2.658974e-02	8.208260e-15
b'RF'	1.000000e+00	1.000000e+00	3.719310e-03	2.326888e-01	9.608601e-11	-1.000000e+00	7.235717e-03	1.000000e+00
b'SV'	4.361970e-02	2.896814e-04	1.000000e+00	8.720876e-06	2.658974e-02	7.235717e-03	-1.000000e+00	3.107835e-05
b'XG'	1.000000e+00	1.000000e+00	1.313997e-05	1.000000e+00	8.208260e-15	1.000000e+00	3.107835e-05	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [560]:
```
ph.sign_table(p_df)
```
Out[560]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	*	***	NS	*	NS
b'KN'	NS	-	***	***	***	NS	***	NS
b'LR'	*	***	-	***	*	**	NS	***
b'ML'	*	***	***	-	***	NS	***	NS
b'NB'	***	***	*	***	-	***	*	***
b'RF'	NS	NS	**	NS	***	-	**	NS
b'SV'	*	***	NS	***	*	**	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

Specificity

In [561]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[561]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	6.857464e-01	2.472924e-01	5.586248e-06	2.220427e-04	4.649548e-01	4.222203e-05	1.339622e-01
b'KN'	0.685746	-1.000000e+00	3.159194e-05	2.630747e-12	7.440632e-12	9.537543e-05	4.678175e-11	1.110707e-05
b'LR'	0.247292	3.159194e-05	-1.000000e+00	2.756012e-01	3.877611e-11	1.000000e+00	7.952584e-01	1.000000e+00
b'ML'	0.000006	2.630747e-12	2.756012e-01	-1.000000e+00	1.167565e-20	1.411195e-01	1.000000e+00	4.866120e-01
b'NB'	0.000222	7.440632e-12	3.877611e-11	1.167565e-20	-1.000000e+00	1.896102e-10	4.869708e-19	8.791071e-12
b'RF'	0.464955	9.537543e-05	1.000000e+00	1.411195e-01	1.896102e-10	-1.000000e+00	4.407618e-01	1.000000e+00
b'SV'	0.000042	4.678175e-11	7.952584e-01	1.000000e+00	4.869708e-19	4.407618e-01	-1.000000e+00	1.000000e+00
b'XG'	0.133962	1.110707e-05	1.000000e+00	4.866120e-01	8.791071e-12	1.000000e+00	1.000000e+00	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [562]:
```
ph.sign_table(p_df)
```
Out[562]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	***	NS	***	NS
b'KN'	NS	-	***	***	***	***	***	***
b'LR'	NS	***	-	NS	***	NS	NS	NS
b'ML'	***	***	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	***	NS	NS	***	-	NS	NS
b'SV'	***	***	NS	NS	***	NS	-	NS
b'XG'	NS	***	NS	NS	***	NS	NS	-

LR+

In [563]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[563]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	7.149435e-01	8.188322e-04	4.855330e-02	2.187181e-04	3.549838e-01	1.338010e-07	9.010370e-01
b'KN'	7.149435e-01	-1.000000e+00	4.006682e-09	2.258435e-06	7.080093e-01	6.412412e-05	1.698417e-14	3.393034e-04
b'LR'	8.188322e-04	4.006682e-09	-1.000000e+00	1.000000e+00	1.447493e-16	1.000000e+00	1.000000e+00	1.000000e+00
b'ML'	4.855330e-02	2.258435e-06	1.000000e+00	-1.000000e+00	8.123306e-13	1.000000e+00	8.151601e-01	1.000000e+00
b'NB'	2.187181e-04	7.080093e-01	1.447493e-16	8.123306e-13	-1.000000e+00	9.328261e-11	2.166525e-22	1.058367e-09
b'RF'	3.549838e-01	6.412412e-05	1.000000e+00	1.000000e+00	9.328261e-11	-1.000000e+00	1.000000e+00	1.000000e+00
b'SV'	1.338010e-07	1.698417e-14	1.000000e+00	8.151601e-01	2.166525e-22	1.000000e+00	-1.000000e+00	5.745425e-03
b'XG'	9.010370e-01	3.393034e-04	1.000000e+00	1.000000e+00	1.058367e-09	1.000000e+00	5.745425e-03	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [564]:
```
ph.sign_table(p_df)
```
Out[564]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	*	***	NS	***	NS
b'KN'	NS	-	***	***	NS	***	***	***
b'LR'	***	***	-	NS	***	NS	NS	NS
b'ML'	*	***	NS	-	***	NS	NS	NS
b'NB'	***	NS	***	***	-	***	***	***
b'RF'	NS	***	NS	NS	***	-	NS	NS
b'SV'	***	***	NS	NS	***	NS	-	**
b'XG'	NS	***	NS	NS	***	NS	**	-

LR-

In [565]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[565]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	1.000000e+00	1.000000e+00	9.181144e-05	1.000000	4.559976e-05	1.000000e+00
b'KN'	1.000000	-1.000000e+00	4.031199e-09	1.000000e+00	1.368357e-09	0.597246	5.208654e-10	1.000000e+00
b'LR'	1.000000	4.031199e-09	-1.000000e+00	2.024980e-09	1.000000e+00	0.000110	1.000000e+00	1.141788e-06
b'ML'	1.000000	1.000000e+00	2.024980e-09	-1.000000e+00	6.760502e-10	0.451318	2.536296e-10	1.000000e+00
b'NB'	0.000092	1.368357e-09	1.000000e+00	6.760502e-10	-1.000000e+00	0.000542	1.000000e+00	4.488452e-07
b'RF'	1.000000	5.972462e-01	1.100041e-04	4.513181e-01	5.418270e-04	-1.000000	2.834767e-04	1.000000e+00
b'SV'	0.000046	5.208654e-10	1.000000e+00	2.536296e-10	1.000000e+00	0.000283	-1.000000e+00	1.942740e-07
b'XG'	1.000000	1.000000e+00	1.141788e-06	1.000000e+00	4.488452e-07	1.000000	1.942740e-07	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [566]:
```
ph.sign_table(p_df)
```
Out[566]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	***	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	***	***	-	***	NS	**	NS	***
b'ML'	NS	NS	***	-	***	NS	***	NS
b'NB'	***	***	NS	***	-	***	NS	***
b'RF'	NS	NS	**	NS	***	-	***	NS
b'SV'	***	***	NS	***	NS	***	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

DOR

In [567]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[567]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.186400e-01	2.516021e-06	1.000000e+00	1.000000e+00	1.000000	2.750676e-08	1.000000
b'KN'	3.186400e-01	-1.000000e+00	9.394496e-14	9.701726e-02	1.000000e+00	0.000170	1.532433e-16	0.020320
b'LR'	2.516021e-06	9.394496e-14	-1.000000e+00	2.038156e-05	2.482195e-11	0.022406	1.000000e+00	0.000193
b'ML'	1.000000e+00	9.701726e-02	2.038156e-05	-1.000000e+00	7.919910e-01	1.000000	2.984653e-07	1.000000
b'NB'	1.000000e+00	1.000000e+00	2.482195e-11	7.919910e-01	-1.000000e+00	0.004145	7.024385e-14	0.225499
b'RF'	1.000000e+00	1.697361e-04	2.240632e-02	1.000000e+00	4.144810e-03	-1.000000	1.066199e-03	1.000000
b'SV'	2.750676e-08	1.532433e-16	1.000000e+00	2.984653e-07	7.024385e-14	0.001066	-1.000000e+00	0.000004
b'XG'	1.000000e+00	2.031969e-02	1.927446e-04	1.000000e+00	2.254986e-01	1.000000	3.960175e-06	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with astVerisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [568]:
```
ph.sign_table(p_df)
```
Out[568]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	***	NS
b'KN'	NS	-	***	NS	NS	***	***	*
b'LR'	***	***	-	***	***	*	NS	***
b'ML'	NS	NS	***	-	NS	NS	***	NS
b'NB'	NS	NS	***	NS	-	**	***	NS
b'RF'	NS	***	*	NS	**	-	**	NS
b'SV'	***	***	NS	***	***	**	-	***
b'XG'	NS	*	***	NS	NS	NS	***	-

SMOTE-Tomek

F1-Score

In [569]:
```
_dict = get_dict('SMOTETomek')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[569]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.600798e-01	6.019472e-06	1.000000	3.991094e-02	1.000000	1.417801e-08	1.000000
b'KN'	1.600798e-01	-1.000000e+00	5.244612e-14	0.009620	1.000000e+00	0.000309	7.533389e-18	0.012231
b'LR'	6.019472e-06	5.244612e-14	-1.000000e+00	0.000349	1.541633e-15	0.010625	1.000000e+00	0.000261
b'ML'	1.000000e+00	9.620429e-03	3.487410e-04	-1.000000	1.729986e-03	1.000000	1.858737e-06	1.000000
b'NB'	3.991094e-02	1.000000e+00	1.541633e-15	0.001730	-1.000000e+00	0.000040	1.435104e-19	0.002256
b'RF'	1.000000e+00	3.094462e-04	1.062498e-02	1.000000	3.991832e-05	-1.000000	1.269965e-04	1.000000
b'SV'	1.417801e-08	7.533389e-18	1.000000e+00	0.000002	1.435104e-19	0.000127	-1.000000e+00	0.000001
b'XG'	1.000000e+00	1.223110e-02	2.605714e-04	1.000000	2.256361e-03	1.000000	1.304013e-06	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [570]:
```
ph.sign_table(p_df)
```
Out[570]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	*	NS	***	NS
b'KN'	NS	-	***	**	NS	***	***	*
b'LR'	***	***	-	***	***	*	NS	***
b'ML'	NS	**	***	-	**	NS	***	NS
b'NB'	*	NS	***	**	-	***	***	**
b'RF'	NS	***	*	NS	***	-	***	NS
b'SV'	***	***	NS	***	***	***	-	***
b'XG'	NS	*	***	NS	**	NS	***	-

Sensitivity

In [571]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[571]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.743656e-01	8.006542e-02	1.766067e-01	1.488365e-08	1.000000e+00	5.290622e-02	2.644072e-01
b'KN'	3.743656e-01	-1.000000e+00	1.361956e-06	1.000000e+00	1.076967e-16	1.000000e+00	6.702666e-07	1.000000e+00
b'LR'	8.006542e-02	1.361956e-06	-1.000000e+00	3.093243e-07	3.502195e-02	9.536585e-03	1.000000e+00	6.811033e-07
b'ML'	1.766067e-01	1.000000e+00	3.093243e-07	-1.000000e+00	1.081316e-17	9.252977e-01	1.475463e-07	1.000000e+00
b'NB'	1.488365e-08	1.076967e-16	3.502195e-02	1.081316e-17	-1.000000e+00	2.745494e-10	5.374446e-02	3.661464e-17
b'RF'	1.000000e+00	1.000000e+00	9.536585e-03	9.252977e-01	2.745494e-10	-1.000000e+00	5.874497e-03	1.000000e+00
b'SV'	5.290622e-02	6.702666e-07	1.000000e+00	1.475463e-07	5.374446e-02	5.874497e-03	-1.000000e+00	3.302808e-07
b'XG'	2.644072e-01	1.000000e+00	6.811033e-07	1.000000e+00	3.661464e-17	1.000000e+00	3.302808e-07	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [572]:
```
ph.sign_table(p_df)
```
Out[572]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	NS	NS	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	NS	***	-	***	*	**	NS	***
b'ML'	NS	NS	***	-	***	NS	***	NS
b'NB'	***	***	*	***	-	***	NS	***
b'RF'	NS	NS	**	NS	***	-	**	NS
b'SV'	NS	***	NS	***	NS	**	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

Specificity

In [573]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[573]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	3.451225e-02	9.680011e-02	2.088384e-03	6.345707e-01	2.251944e-06	2.544548e-03
b'KN'	1.000000e+00	-1.000000e+00	4.591826e-05	2.238274e-12	4.602986e-01	3.427969e-03	1.192442e-10	1.218881e-06
b'LR'	3.451225e-02	4.591826e-05	-1.000000e+00	2.079718e-01	1.782593e-11	1.000000e+00	9.174513e-01	1.000000e+00
b'ML'	9.680011e-02	2.238274e-12	2.079718e-01	-1.000000e+00	1.581467e-21	7.960187e-03	1.000000e+00	1.000000e+00
b'NB'	2.088384e-03	4.602986e-01	1.782593e-11	1.581467e-21	-1.000000e+00	1.223407e-08	3.039898e-19	9.547933e-14
b'RF'	6.345707e-01	3.427969e-03	1.000000e+00	7.960187e-03	1.223407e-08	-1.000000e+00	5.659259e-02	1.000000e+00
b'SV'	2.251944e-06	1.192442e-10	9.174513e-01	1.000000e+00	3.039898e-19	5.659259e-02	-1.000000e+00	1.000000e+00
b'XG'	2.544548e-03	1.218881e-06	1.000000e+00	1.000000e+00	9.547933e-14	1.000000e+00	1.000000e+00	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [574]:
```
ph.sign_table(p_df)
```
Out[574]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	NS	**	NS	***	**
b'KN'	NS	-	***	***	NS	**	***	***
b'LR'	*	***	-	NS	***	NS	NS	NS
b'ML'	NS	***	NS	-	***	**	NS	NS
b'NB'	**	NS	***	***	-	***	***	***
b'RF'	NS	**	NS	**	***	-	NS	NS
b'SV'	***	***	NS	NS	***	NS	-	NS
b'XG'	**	***	NS	NS	***	NS	NS	-

LR+

In [575]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[575]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	3.856728e-05	8.564542e-04	1.719903e-03	6.995469e-01	1.811086e-09	1.272598e-01
b'KN'	1.000000e+00	-1.000000e+00	7.022712e-10	5.077669e-08	8.559649e-01	1.227271e-03	1.518381e-15	7.943861e-05
b'LR'	3.856728e-05	7.022712e-10	-1.000000e+00	1.000000e+00	2.789867e-17	2.714032e-01	1.000000e+00	1.000000e+00
b'ML'	8.564542e-04	5.077669e-08	1.000000e+00	-1.000000e+00	8.194390e-15	1.000000e+00	5.069567e-01	1.000000e+00
b'NB'	1.719903e-03	8.559649e-01	2.789867e-17	8.194390e-15	-1.000000e+00	1.157234e-08	1.585906e-24	2.142857e-10
b'RF'	6.995469e-01	1.227271e-03	2.714032e-01	1.000000e+00	1.157234e-08	-1.000000e+00	4.983842e-04	1.000000e+00
b'SV'	1.811086e-09	1.518381e-15	1.000000e+00	5.069567e-01	1.585906e-24	4.983842e-04	-1.000000e+00	6.160013e-03
b'XG'	1.272598e-01	7.943861e-05	1.000000e+00	1.000000e+00	2.142857e-10	1.000000e+00	6.160013e-03	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [576]:
```
ph.sign_table(p_df)
```
Out[576]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	***	**	NS	***	NS
b'KN'	NS	-	***	***	NS	**	***	***
b'LR'	***	***	-	NS	***	NS	NS	NS
b'ML'	***	***	NS	-	***	NS	NS	NS
b'NB'	**	NS	***	***	-	***	***	***
b'RF'	NS	**	NS	NS	***	-	***	NS
b'SV'	***	***	NS	NS	***	***	-	**
b'XG'	NS	***	NS	NS	***	NS	**	-

LR-

In [577]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[577]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.364424e-01	2.703754e-04	1.000000e+00	5.486492e-04	1.000000	1.634361e-05	1.000000e+00
b'KN'	0.136442	-1.000000e+00	1.255892e-11	1.000000e+00	3.899547e-11	0.110881	1.577946e-13	1.000000e+00
b'LR'	0.000270	1.255892e-11	-1.000000e+00	4.821925e-08	1.000000e+00	0.000366	1.000000e+00	2.139282e-08
b'ML'	1.000000	1.000000e+00	4.821925e-08	-1.000000e+00	1.244080e-07	1.000000	1.199882e-09	1.000000e+00
b'NB'	0.000549	3.899547e-11	1.000000e+00	1.244080e-07	-1.000000e+00	0.000736	1.000000e+00	5.629417e-08
b'RF'	1.000000	1.108809e-01	3.663148e-04	1.000000e+00	7.360637e-04	-1.000000	2.296303e-05	1.000000e+00
b'SV'	0.000016	1.577946e-13	1.000000e+00	1.199882e-09	1.000000e+00	0.000023	-1.000000e+00	4.949492e-10
b'XG'	1.000000	1.000000e+00	2.139282e-08	1.000000e+00	5.629417e-08	1.000000	4.949492e-10	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [578]:
```
ph.sign_table(p_df)
```
Out[578]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	***	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	***	***	-	***	NS	***	NS	***
b'ML'	NS	NS	***	-	***	NS	***	NS
b'NB'	***	***	NS	***	-	***	NS	***
b'RF'	NS	NS	***	NS	***	-	***	NS
b'SV'	***	***	NS	***	NS	***	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

DOR

In [579]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[579]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	7.714004e-02	1.430578e-06	1.000000	1.000000e+00	1.000000	4.665657e-09	1.000000e+00
b'KN'	7.714004e-02	-1.000000e+00	8.787429e-16	0.001457	1.000000e+00	0.000153	1.792957e-19	8.292723e-03
b'LR'	1.430578e-06	8.787429e-16	-1.000000e+00	0.000310	2.415857e-11	0.002742	1.000000e+00	3.966212e-05
b'ML'	1.000000e+00	1.456826e-03	3.101946e-04	-1.000000	1.639314e-01	1.000000	2.648458e-06	1.000000e+00
b'NB'	1.000000e+00	1.000000e+00	2.415857e-11	0.163931	-1.000000e+00	0.031740	1.634836e-14	5.573597e-01
b'RF'	1.000000e+00	1.533814e-04	2.741669e-03	1.000000	3.173959e-02	-1.000000	3.680684e-05	1.000000e+00
b'SV'	4.665657e-09	1.792957e-19	1.000000e+00	0.000003	1.634836e-14	0.000037	-1.000000e+00	2.292993e-07
b'XG'	1.000000e+00	8.292723e-03	3.966212e-05	1.000000	5.573597e-01	1.000000	2.292993e-07	-1.000000e+00

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [580]:
```
ph.sign_table(p_df)
```
Out[580]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	***	NS
b'KN'	NS	-	***	**	NS	***	***	**
b'LR'	***	***	-	***	***	**	NS	***
b'ML'	NS	**	***	-	NS	NS	***	NS
b'NB'	NS	NS	***	NS	-	*	***	NS
b'RF'	NS	***	**	NS	*	-	***	NS
b'SV'	***	***	NS	***	***	***	-	***
b'XG'	NS	**	***	NS	NS	NS	***	-

FLEURY DataSet

ADASYN

F1-Score

In [581]:
```
dataset = 'FLEURY'
file_path = f'{workspace}/{dataset}'

_dict = get_dict('ADASYN')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[581]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	6.408283e-01	1.194027e-04	1.000000e+00	0.467392	3.871231e-06	1.210113e-04	1.000000
b'KN'	0.640828	-1.000000e+00	1.755519e-10	1.000000e+00	0.000085	1.287291e-12	1.790194e-10	0.062532
b'LR'	0.000119	1.755519e-10	-1.000000e+00	2.543789e-05	0.769398	1.000000e+00	1.000000e+00	0.003797
b'ML'	1.000000	1.000000e+00	2.543789e-05	-1.000000e+00	0.190771	6.735520e-07	2.580227e-05	1.000000
b'NB'	0.467392	8.485875e-05	7.693980e-01	1.907712e-01	-1.000000	1.134370e-01	7.749000e-01	1.000000
b'RF'	0.000004	1.287291e-12	1.000000e+00	6.735520e-07	0.113437	-1.000000e+00	1.000000e+00	0.000204
b'SV'	0.000121	1.790194e-10	1.000000e+00	2.580227e-05	0.774900	1.000000e+00	-1.000000e+00	0.003840
b'XG'	1.000000	6.253197e-02	3.796690e-03	1.000000e+00	1.000000	2.036315e-04	3.839818e-03	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [582]:
```
ph.sign_table(p_df)
```
Out[582]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	***	***	NS
b'KN'	NS	-	***	NS	***	***	***	NS
b'LR'	***	***	-	***	NS	NS	NS	**
b'ML'	NS	NS	***	-	NS	***	***	NS
b'NB'	NS	***	NS	NS	-	NS	NS	NS
b'RF'	***	***	NS	***	NS	-	NS	***
b'SV'	***	***	NS	***	NS	NS	-	**
b'XG'	NS	NS	**	NS	NS	***	**	-

Sensitivity

In [583]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[583]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	3.564485e-02	1.000000	2.612653e-03	3.909541e-05	1.000000	1.000000	1.000000
b'KN'	0.035645	-1.000000e+00	0.000278	1.000000e+00	2.365520e-14	0.000601	0.000492	0.004017
b'LR'	1.000000	2.781614e-04	-1.000000	9.312864e-06	7.968738e-03	1.000000	1.000000	1.000000
b'ML'	0.002613	1.000000e+00	0.000009	-1.000000e+00	6.950297e-17	0.000023	0.000018	0.000202
b'NB'	0.000039	2.365520e-14	0.007969	6.950297e-17	-1.000000e+00	0.004078	0.004879	0.000611
b'RF'	1.000000	6.009207e-04	1.000000	2.250106e-05	4.077548e-03	-1.000000	1.000000	1.000000
b'SV'	1.000000	4.917598e-04	1.000000	1.787854e-05	4.878564e-03	1.000000	-1.000000	1.000000
b'XG'	1.000000	4.016713e-03	1.000000	2.017717e-04	6.109913e-04	1.000000	1.000000	-1.000000

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [584]:
```
ph.sign_table(p_df)
```
Out[584]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	NS	**	***	NS	NS	NS
b'KN'	*	-	***	NS	***	***	***	**
b'LR'	NS	***	-	***	**	NS	NS	NS
b'ML'	**	NS	***	-	***	***	***	***
b'NB'	***	***	**	***	-	**	**	***
b'RF'	NS	***	NS	***	**	-	NS	NS
b'SV'	NS	***	NS	***	**	NS	-	NS
b'XG'	NS	**	NS	***	***	NS	NS	-

Specificity

In [585]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[585]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	7.533656e-03	1.171919e-07	2.150471e-01	5.890632e-04	3.258822e-03	1.000000
b'KN'	1.000000e+00	-1.000000e+00	1.283897e-02	2.695595e-07	1.407400e-01	1.088541e-03	5.710158e-03	1.000000
b'LR'	7.533656e-03	1.283897e-02	-1.000000e+00	7.148309e-01	7.852799e-09	1.000000e+00	1.000000e+00	0.042690
b'ML'	1.171919e-07	2.695595e-07	7.148309e-01	-1.000000e+00	3.677581e-16	1.000000e+00	1.000000e+00	0.000002
b'NB'	2.150471e-01	1.407400e-01	7.852799e-09	3.677581e-16	-1.000000e+00	1.270037e-10	1.976134e-09	0.047425
b'RF'	5.890632e-04	1.088541e-03	1.000000e+00	1.000000e+00	1.270037e-10	-1.000000e+00	1.000000e+00	0.004389
b'SV'	3.258822e-03	5.710158e-03	1.000000e+00	1.000000e+00	1.976134e-09	1.000000e+00	-1.000000e+00	0.020284
b'XG'	1.000000e+00	1.000000e+00	4.268963e-02	1.832472e-06	4.742515e-02	4.388845e-03	2.028361e-02	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [586]:
```
ph.sign_table(p_df)
```
Out[586]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	***	NS	***	**	NS
b'KN'	NS	-	*	***	NS	**	**	NS
b'LR'	**	*	-	NS	***	NS	NS	*
b'ML'	***	***	NS	-	***	NS	NS	***
b'NB'	NS	NS	***	***	-	***	***	*
b'RF'	***	**	NS	NS	***	-	NS	**
b'SV'	**	**	NS	NS	***	NS	-	*
b'XG'	NS	NS	*	***	*	**	*	-

LR+

In [587]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[587]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	7.381983e-05	0.001433	1.000000e+00	9.789847e-07	5.766679e-05	1.000000
b'KN'	1.000000e+00	-1.000000e+00	7.478762e-08	0.000003	1.000000e+00	3.658081e-10	5.496149e-08	1.000000
b'LR'	7.381983e-05	7.478762e-08	-1.000000e+00	1.000000	5.272519e-06	1.000000e+00	1.000000e+00	0.002925
b'ML'	1.433155e-03	3.180777e-06	1.000000e+00	-1.000000	1.409318e-04	1.000000e+00	1.000000e+00	0.034315
b'NB'	1.000000e+00	1.000000e+00	5.272519e-06	0.000141	-1.000000e+00	4.653475e-08	4.017433e-06	1.000000
b'RF'	9.789847e-07	3.658081e-10	1.000000e+00	1.000000	4.653475e-08	-1.000000e+00	1.000000e+00	0.000074
b'SV'	5.766679e-05	5.496149e-08	1.000000e+00	1.000000	4.017433e-06	1.000000e+00	-1.000000e+00	0.002376
b'XG'	1.000000e+00	1.000000e+00	2.924755e-03	0.034315	1.000000e+00	7.381983e-05	2.376401e-03	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [588]:
```
ph.sign_table(p_df)
```
Out[588]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	**	NS	***	***	NS
b'KN'	NS	-	***	***	NS	***	***	NS
b'LR'	***	***	-	NS	***	NS	NS	**
b'ML'	**	***	NS	-	***	NS	NS	*
b'NB'	NS	NS	***	***	-	***	***	NS
b'RF'	***	***	NS	NS	***	-	NS	***
b'SV'	***	***	NS	NS	***	NS	-	**
b'XG'	NS	NS	**	*	NS	***	**	-

LR-

In [589]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[589]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	7.036580e-02	6.993478e-02	9.371776e-01	1.876968e-04	3.051017e-02	1.073214e-01	1.000000
b'KN'	0.070366	-1.000000e+00	4.173438e-08	1.000000e+00	1.480048e-12	9.000911e-09	9.385579e-08	0.003511
b'LR'	0.069935	4.173438e-08	-1.000000e+00	7.293016e-06	1.000000e+00	1.000000e+00	1.000000e+00	0.758805
b'ML'	0.937178	1.000000e+00	7.293016e-06	-1.000000e+00	9.444855e-10	1.943537e-06	1.462034e-05	0.091916
b'NB'	0.000188	1.480048e-12	1.000000e+00	9.444855e-10	-1.000000e+00	1.000000e+00	1.000000e+00	0.006295
b'RF'	0.030510	9.000911e-09	1.000000e+00	1.943537e-06	1.000000e+00	-1.000000e+00	1.000000e+00	0.396961
b'SV'	0.107321	9.385579e-08	1.000000e+00	1.462034e-05	1.000000e+00	1.000000e+00	-1.000000e+00	1.000000
b'XG'	1.000000	3.511286e-03	7.588053e-01	9.191608e-02	6.295391e-03	3.969609e-01	1.000000e+00	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [590]:
```
ph.sign_table(p_df)
```
Out[590]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	*	NS	NS
b'KN'	NS	-	***	NS	***	***	***	**
b'LR'	NS	***	-	***	NS	NS	NS	NS
b'ML'	NS	NS	***	-	***	***	***	NS
b'NB'	***	***	NS	***	-	NS	NS	**
b'RF'	*	***	NS	***	NS	-	NS	NS
b'SV'	NS	***	NS	***	NS	NS	-	NS
b'XG'	NS	**	NS	NS	**	NS	NS	-

DOR

In [591]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[591]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	6.226252e-01	2.293786e-04	1.000000	0.063559	2.451585e-06	2.501281e-04	1.000000
b'KN'	0.622625	-1.000000e+00	4.243548e-10	0.067819	0.000003	6.219687e-13	4.822676e-10	0.036863
b'LR'	0.000229	4.243548e-10	-1.000000e+00	0.005724	1.000000	1.000000e+00	1.000000e+00	0.011459
b'ML'	1.000000	6.781907e-02	5.723619e-03	-1.000000	0.591369	1.159266e-04	6.159216e-03	1.000000
b'NB'	0.063559	2.620755e-06	1.000000e+00	0.591369	-1.000000	6.031110e-01	1.000000e+00	0.937202
b'RF'	0.000002	6.219687e-13	1.000000e+00	0.000116	0.603111	-1.000000e+00	1.000000e+00	0.000270
b'SV'	0.000250	4.822676e-10	1.000000e+00	0.006159	1.000000	1.000000e+00	-1.000000e+00	0.012292
b'XG'	1.000000	3.686289e-02	1.145876e-02	1.000000	0.937202	2.703261e-04	1.229198e-02	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [592]:
```
ph.sign_table(p_df)
```
Out[592]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	***	***	NS
b'KN'	NS	-	***	NS	***	***	***	*
b'LR'	***	***	-	**	NS	NS	NS	*
b'ML'	NS	NS	**	-	NS	***	**	NS
b'NB'	NS	***	NS	NS	-	NS	NS	NS
b'RF'	***	***	NS	***	NS	-	NS	***
b'SV'	***	***	NS	**	NS	NS	-	*
b'XG'	NS	*	*	NS	NS	***	*	-

ORIGINAL

F1-Score

In [593]:
```
_dict = get_dict('ORIGINAL')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[593]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	4.110057e-02	1.000000e+00	1.000000	4.551243e-06	1.000000e+00	1.000000e+00	1.000000
b'KN'	0.041101	-1.000000e+00	5.156734e-11	0.001752	1.065807e-15	1.000000e+00	1.000000e+00	0.004033
b'LR'	1.000000	5.156734e-11	-1.000000e+00	1.000000	3.774042e-08	1.000000e+00	1.000000e+00	1.000000
b'ML'	1.000000	1.751736e-03	1.000000e+00	-1.000000	2.818111e-04	2.500625e-01	1.000000e+00	1.000000
b'NB'	0.000005	1.065807e-15	3.774042e-08	0.000282	-1.000000e+00	5.763459e-11	3.688727e-09	0.000109
b'RF'	1.000000	1.000000e+00	1.000000e+00	0.250062	5.763459e-11	-1.000000e+00	1.000000e+00	0.443111
b'SV'	1.000000	1.000000e+00	1.000000e+00	1.000000	3.688727e-09	1.000000e+00	-1.000000e+00	1.000000
b'XG'	1.000000	4.032581e-03	1.000000e+00	1.000000	1.087217e-04	4.431108e-01	1.000000e+00	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [594]:
```
ph.sign_table(p_df)
```
Out[594]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	NS	NS	***	NS	NS	NS
b'KN'	*	-	***	**	***	NS	NS	**
b'LR'	NS	***	-	NS	***	NS	NS	NS
b'ML'	NS	**	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	NS	***	-	NS	NS
b'SV'	NS	NS	NS	NS	***	NS	-	NS
b'XG'	NS	**	NS	NS	***	NS	NS	-

Sensitivity

In [595]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[595]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	7.627266e-06	3.485939e-01	1.000000	2.223235e-04	3.752248e-03	1.228813e-02	1.000000
b'KN'	0.000008	-1.000000e+00	2.304492e-01	0.000056	2.063255e-20	1.000000e+00	1.000000e+00	0.000002
b'LR'	0.348594	2.304492e-01	-1.000000e+00	0.875869	9.135117e-11	1.000000e+00	1.000000e+00	0.149503
b'ML'	1.000000	5.624053e-05	8.758694e-01	-1.000000	3.356295e-05	1.690600e-02	4.953632e-02	1.000000
b'NB'	0.000222	2.063255e-20	9.135117e-11	0.000034	-1.000000e+00	3.285886e-15	4.020657e-14	0.000816
b'RF'	0.003752	1.000000e+00	1.000000e+00	0.016906	3.285886e-15	-1.000000e+00	1.000000e+00	0.001129
b'SV'	0.012288	1.000000e+00	1.000000e+00	0.049536	4.020657e-14	1.000000e+00	-1.000000e+00	0.004015
b'XG'	1.000000	1.593164e-06	1.495030e-01	1.000000	8.158195e-04	1.128897e-03	4.015377e-03	-1.000000

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [596]:
```
ph.sign_table(p_df)
```
Out[596]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	NS	NS	***	**	*	NS
b'KN'	***	-	NS	***	***	NS	NS	***
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	***	NS	-	***	*	*	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	**	NS	NS	*	***	-	NS	**
b'SV'	*	NS	NS	*	***	NS	-	**
b'XG'	NS	***	NS	NS	***	**	**	-

Specificity

In [597]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[597]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	2.211920e-11	5.590866e-06	0.029891	1.000000e+00	4.895956e-10	3.185292e-09	1.000000e+00
b'KN'	2.211920e-11	-1.000000e+00	1.000000e+00	0.002798	8.470548e-19	1.000000e+00	1.000000e+00	3.485606e-08
b'LR'	5.590866e-06	1.000000e+00	-1.000000e+00	1.000000	2.367210e-11	1.000000e+00	1.000000e+00	1.701023e-03
b'ML'	2.989098e-02	2.797731e-03	1.000000e+00	-1.000000	2.791552e-06	1.549318e-02	4.190545e-02	8.118325e-01
b'NB'	1.000000e+00	8.470548e-19	2.367210e-11	0.000003	-1.000000e+00	4.545262e-17	5.190477e-16	4.671057e-02
b'RF'	4.895956e-10	1.000000e+00	1.000000e+00	0.015493	4.545262e-17	-1.000000e+00	1.000000e+00	4.842687e-07
b'SV'	3.185293e-09	1.000000e+00	1.000000e+00	0.041905	5.190477e-16	1.000000e+00	-1.000000e+00	2.344375e-06
b'XG'	1.000000e+00	3.485606e-08	1.701023e-03	0.811832	4.671057e-02	4.842687e-07	2.344375e-06	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [598]:
```
ph.sign_table(p_df)
```
Out[598]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	*	NS	***	***	NS
b'KN'	***	-	NS	**	***	NS	NS	***
b'LR'	***	NS	-	NS	***	NS	NS	**
b'ML'	*	**	NS	-	***	*	*	NS
b'NB'	NS	***	***	***	-	***	***	*
b'RF'	***	NS	NS	*	***	-	NS	***
b'SV'	***	NS	NS	*	***	NS	-	***
b'XG'	NS	***	**	NS	*	***	***	-

LR+

In [599]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[599]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	2.136136e-11	6.969956e-07	0.000783	1.000000e+00	3.315198e-11	1.843432e-10	1.000000
b'KN'	2.136136e-11	-1.000000e+00	1.000000e+00	0.081217	5.953938e-12	1.000000e+00	1.000000e+00	0.000003
b'LR'	6.969956e-07	1.000000e+00	-1.000000e+00	1.000000	2.544160e-07	1.000000e+00	1.000000e+00	0.006113
b'ML'	7.825181e-04	8.121702e-02	1.000000e+00	-1.000000	3.600053e-04	9.875233e-02	2.081017e-01	0.581223
b'NB'	1.000000e+00	5.953938e-12	2.544160e-07	0.000360	-1.000000e+00	9.335676e-12	5.407864e-11	1.000000
b'RF'	3.315198e-11	1.000000e+00	1.000000e+00	0.098752	9.335676e-12	-1.000000e+00	1.000000e+00	0.000005
b'SV'	1.843432e-10	1.000000e+00	1.000000e+00	0.208102	5.407864e-11	1.000000e+00	-1.000000e+00	0.000017
b'XG'	1.000000e+00	3.416670e-06	6.113407e-03	0.581223	1.000000e+00	4.746225e-06	1.697727e-05	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [600]:
```
ph.sign_table(p_df)
```
Out[600]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	***	NS	***	***	NS
b'KN'	***	-	NS	NS	***	NS	NS	***
b'LR'	***	NS	-	NS	***	NS	NS	**
b'ML'	***	NS	NS	-	***	NS	NS	NS
b'NB'	NS	***	***	***	-	***	***	NS
b'RF'	***	NS	NS	NS	***	-	NS	***
b'SV'	***	NS	NS	NS	***	NS	-	***
b'XG'	NS	***	**	NS	NS	***	***	-

LR-

In [601]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[601]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	7.227930e-03	1.000000e+00	1.000000	2.110509e-06	5.081536e-01	1.000000e+00	1.000000
b'KN'	0.007228	-1.000000e+00	5.628291e-01	0.001428	4.723709e-18	1.000000e+00	1.000000e+00	0.001267
b'LR'	1.000000	5.628291e-01	-1.000000e+00	1.000000	5.545469e-10	1.000000e+00	1.000000e+00	1.000000
b'ML'	1.000000	1.427595e-03	1.000000e+00	-1.000000	1.772599e-05	1.620447e-01	6.489140e-01	1.000000
b'NB'	0.000002	4.723709e-18	5.545469e-10	0.000018	-1.000000e+00	2.774050e-13	1.155177e-11	0.000020
b'RF'	0.508154	1.000000e+00	1.000000e+00	0.162045	2.774050e-13	-1.000000e+00	1.000000e+00	0.148731
b'SV'	1.000000	1.000000e+00	1.000000e+00	0.648914	1.155177e-11	1.000000e+00	-1.000000e+00	0.603057
b'XG'	1.000000	1.266674e-03	1.000000e+00	1.000000	2.046689e-05	1.487315e-01	6.030570e-01	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [602]:
```
ph.sign_table(p_df)
```
Out[602]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	NS	NS	***	NS	NS	NS
b'KN'	**	-	NS	**	***	NS	NS	**
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	**	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	NS	***	-	NS	NS
b'SV'	NS	NS	NS	NS	***	NS	-	NS
b'XG'	NS	**	NS	NS	***	NS	NS	-

DOR

In [603]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[603]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	3.437929e-07	0.000505	0.007022	0.000405	4.658837e-07	5.506116e-07	1.000000
b'KN'	3.437929e-07	-1.000000e+00	1.000000	1.000000	1.000000	1.000000e+00	1.000000e+00	0.002648
b'LR'	5.045070e-04	1.000000e+00	-1.000000	1.000000	1.000000	1.000000e+00	1.000000e+00	0.351239
b'ML'	7.021808e-03	1.000000e+00	1.000000	-1.000000	1.000000	1.000000e+00	1.000000e+00	1.000000
b'NB'	4.053883e-04	1.000000e+00	1.000000	1.000000	-1.000000	1.000000e+00	1.000000e+00	0.306152
b'RF'	4.658837e-07	1.000000e+00	1.000000	1.000000	1.000000	-1.000000e+00	1.000000e+00	0.003279
b'SV'	5.506116e-07	1.000000e+00	1.000000	1.000000	1.000000	1.000000e+00	-1.000000e+00	0.003688
b'XG'	1.000000e+00	2.647762e-03	0.351239	1.000000	0.306152	3.279491e-03	3.687798e-03	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [604]:
```
ph.sign_table(p_df)
```
Out[604]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	***	**	***	***	***	NS
b'KN'	***	-	NS	NS	NS	NS	NS	**
b'LR'	***	NS	-	NS	NS	NS	NS	NS
b'ML'	**	NS	NS	-	NS	NS	NS	NS
b'NB'	***	NS	NS	NS	-	NS	NS	NS
b'RF'	***	NS	NS	NS	NS	-	NS	**
b'SV'	***	NS	NS	NS	NS	NS	-	**
b'XG'	NS	**	NS	NS	NS	**	**	-

ROS

F1-Score

In [605]:
```
_dict = get_dict('ROS')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[605]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000236	0.004446	1.000000e+00	0.057869	2.416813e-09	0.000022	1.000000e+00
b'KN'	2.362154e-04	-1.000000	1.000000	8.965002e-05	1.000000	1.000000e+00	1.000000	6.884289e-04
b'LR'	4.446205e-03	1.000000	-1.000000	1.925346e-03	1.000000	1.871112e-01	1.000000	1.113344e-02
b'ML'	1.000000e+00	0.000090	0.001925	-1.000000e+00	0.028647	6.130679e-10	0.000008	1.000000e+00
b'NB'	5.786889e-02	1.000000	1.000000	2.864658e-02	-1.000000	1.827695e-02	1.000000	1.242635e-01
b'RF'	2.416813e-09	1.000000	0.187111	6.130679e-10	0.018277	-1.000000e+00	1.000000	1.120773e-08
b'SV'	2.217864e-05	1.000000	1.000000	7.654520e-06	1.000000	1.000000e+00	-1.000000	7.211299e-05
b'XG'	1.000000e+00	0.000688	0.011133	1.000000e+00	0.124263	1.120773e-08	0.000072	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [606]:
```
ph.sign_table(p_df)
```
Out[606]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	**	NS	NS	***	***	NS
b'KN'	***	-	NS	***	NS	NS	NS	***
b'LR'	**	NS	-	**	NS	NS	NS	*
b'ML'	NS	***	**	-	*	***	***	NS
b'NB'	NS	NS	NS	*	-	*	NS	NS
b'RF'	***	NS	NS	***	*	-	NS	***
b'SV'	***	NS	NS	***	NS	NS	-	***
b'XG'	NS	***	*	NS	NS	***	***	-

Sensitivity

In [607]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[607]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.460542	0.048819	8.001075e-01	2.896441e-10	0.033067	2.375026e-02	6.898626e-01
b'KN'	4.605423e-01	-1.000000	1.000000	1.252327e-04	2.992079e-04	1.000000	1.000000e+00	9.482840e-05
b'LR'	4.881933e-02	1.000000	-1.000000	2.904579e-06	6.768414e-03	1.000000	1.000000e+00	2.111333e-06
b'ML'	8.001075e-01	0.000125	0.000003	-1.000000e+00	6.864516e-18	0.000002	9.180716e-07	1.000000e+00
b'NB'	2.896441e-10	0.000299	0.006768	6.864516e-18	-1.000000e+00	0.010456	1.484275e-02	4.052565e-18
b'RF'	3.306710e-02	1.000000	1.000000	1.553917e-06	1.045576e-02	-1.000000	1.000000e+00	1.122425e-06
b'SV'	2.375026e-02	1.000000	1.000000	9.180716e-07	1.484275e-02	1.000000	-1.000000e+00	6.596839e-07
b'XG'	6.898626e-01	0.000095	0.000002	1.000000e+00	4.052565e-18	0.000001	6.596839e-07	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [608]:
```
ph.sign_table(p_df)
```
Out[608]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	NS	***	*	*	NS
b'KN'	NS	-	NS	***	***	NS	NS	***
b'LR'	*	NS	-	***	**	NS	NS	***
b'ML'	NS	***	***	-	***	***	***	NS
b'NB'	***	***	**	***	-	*	*	***
b'RF'	*	NS	NS	***	*	-	NS	***
b'SV'	*	NS	NS	***	*	NS	-	***
b'XG'	NS	***	***	NS	***	***	***	-

Specificity

In [609]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[609]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	8.078806e-01	1.000000	1.034949e-04	5.836759e-03	1.763500e-04	1.000000	8.641887e-05
b'KN'	0.807881	-1.000000e+00	0.549527	4.086562e-01	1.055267e-07	5.536377e-01	1.000000	3.683923e-01
b'LR'	1.000000	5.495265e-01	-1.000000	5.014277e-05	1.035983e-02	8.681073e-05	1.000000	4.164789e-05
b'ML'	0.000103	4.086562e-01	0.000050	-1.000000e+00	2.146013e-15	1.000000e+00	0.039921	1.000000e+00
b'NB'	0.005837	1.055267e-07	0.010360	2.146013e-15	-1.000000e+00	5.480628e-15	0.000007	1.565715e-15
b'RF'	0.000176	5.536377e-01	0.000087	1.000000e+00	5.480628e-15	-1.000000e+00	0.058402	1.000000e+00
b'SV'	1.000000	1.000000e+00	1.000000	3.992141e-02	7.414012e-06	5.840215e-02	-1.000000	3.507579e-02
b'XG'	0.000086	3.683923e-01	0.000042	1.000000e+00	1.565715e-15	1.000000e+00	0.035076	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [610]:
```
ph.sign_table(p_df)
```
Out[610]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	**	***	NS	***
b'KN'	NS	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	***	*	***	NS	***
b'ML'	***	NS	***	-	***	NS	*	NS
b'NB'	**	***	*	***	-	***	***	***
b'RF'	***	NS	***	NS	***	-	NS	NS
b'SV'	NS	NS	NS	*	***	NS	-	*
b'XG'	***	NS	***	NS	***	NS	*	-

LR+

In [611]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[611]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000311	0.410471	0.021514	1.000000e+00	8.438158e-11	0.001324	0.011619
b'KN'	3.113773e-04	-1.000000	1.000000	1.000000	1.153033e-06	2.742982e-01	1.000000	1.000000
b'LR'	4.104712e-01	1.000000	-1.000000	1.000000	1.153740e-02	1.602170e-04	1.000000	1.000000
b'ML'	2.151372e-02	1.000000	1.000000	-1.000000	2.343352e-04	8.470498e-03	1.000000	1.000000
b'NB'	1.000000e+00	0.000001	0.011537	0.000234	-1.000000e+00	1.990204e-14	0.000007	0.000106
b'RF'	8.438158e-11	0.274298	0.000160	0.008470	1.990204e-14	-1.000000e+00	0.101733	0.015889
b'SV'	1.323575e-03	1.000000	1.000000	1.000000	6.903807e-06	1.017326e-01	-1.000000	1.000000
b'XG'	1.161880e-02	1.000000	1.000000	1.000000	1.064428e-04	1.588920e-02	1.000000	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [612]:
```
ph.sign_table(p_df)
```
Out[612]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	NS	*	NS	***	**	*
b'KN'	***	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	NS	*	***	NS	NS
b'ML'	*	NS	NS	-	***	**	NS	NS
b'NB'	NS	***	*	***	-	***	***	***
b'RF'	***	NS	***	**	***	-	NS	*
b'SV'	**	NS	NS	NS	***	NS	-	NS
b'XG'	*	NS	NS	NS	***	*	NS	-

LR-

In [613]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[613]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.009199	0.006674	1.000000e+00	2.145293e-07	9.567617e-06	0.000376	1.000000e+00
b'KN'	9.198633e-03	-1.000000	1.000000	9.558894e-05	8.108784e-01	1.000000e+00	1.000000	1.138679e-04
b'LR'	6.674045e-03	1.000000	-1.000000	6.381553e-05	9.972547e-01	1.000000e+00	1.000000	7.623869e-05
b'ML'	1.000000e+00	0.000096	0.000064	-1.000000e+00	2.407022e-10	2.150957e-08	0.000002	1.000000e+00
b'NB'	2.145293e-07	0.810878	0.997255	2.407022e-10	-1.000000e+00	1.000000e+00	1.000000	3.097045e-10
b'RF'	9.567617e-06	1.000000	1.000000	2.150957e-08	1.000000e+00	-1.000000e+00	1.000000	2.701868e-08
b'SV'	3.756843e-04	1.000000	1.000000	1.807694e-06	1.000000e+00	1.000000e+00	-1.000000	2.211657e-06
b'XG'	1.000000e+00	0.000114	0.000076	1.000000e+00	3.097045e-10	2.701868e-08	0.000002	-1.000000e+00

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [614]:
```
ph.sign_table(p_df)
```
Out[614]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	**	NS	***	***	***	NS
b'KN'	**	-	NS	***	NS	NS	NS	***
b'LR'	**	NS	-	***	NS	NS	NS	***
b'ML'	NS	***	***	-	***	***	***	NS
b'NB'	***	NS	NS	***	-	NS	NS	***
b'RF'	***	NS	NS	***	NS	-	NS	***
b'SV'	***	NS	NS	***	NS	NS	-	***
b'XG'	NS	***	***	NS	***	***	***	-

DOR

In [615]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[615]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000097	0.005661	1.000000e+00	0.059176	5.061489e-11	0.000018	1.000000e+00
b'KN'	9.733273e-05	-1.000000	1.000000	8.442028e-03	1.000000	4.490042e-01	1.000000	4.541738e-02
b'LR'	5.660940e-03	1.000000	-1.000000	2.001749e-01	1.000000	2.411788e-02	1.000000	7.251711e-01
b'ML'	1.000000e+00	0.008442	0.200175	-1.000000e+00	1.000000	4.820562e-08	0.002158	1.000000e+00
b'NB'	5.917593e-02	1.000000	1.000000	1.000000e+00	-1.000000	1.972634e-03	1.000000	1.000000e+00
b'RF'	5.061489e-11	0.449004	0.024118	4.820562e-08	0.001973	-1.000000e+00	1.000000	7.553228e-07
b'SV'	1.781872e-05	1.000000	1.000000	2.157609e-03	1.000000	1.000000e+00	-1.000000	1.346006e-02
b'XG'	1.000000e+00	0.045417	0.725171	1.000000e+00	1.000000	7.553228e-07	0.013460	-1.000000e+00

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [616]: ph.sign_table(p_df)
```
Out[616]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	NS	NS	NS	***	***	NS
b'KN'	***	-	NS	**	NS	NS	NS	*
b'LR'	**	NS	-	NS	NS	*	NS	NS
b'ML'	**	**	NS	-	NS	***	**	NS
b'NB'	NS	NS	NS	NS	-	**	NS	NS
b'RF'	***	NS	*	***	**	-	NS	***
b'SV'	***	NS	NS	**	NS	NS	-	*
b'XG'	NS	*	NS	NS	NS	***	*	-

RUS

F1-Score

```
In [617]: _dict = get_dict('RUS')
          p_df = get_p_df(_dict, 'f1_score')
          p_df
```
Out[617]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.000009	0.009835	0.536732	0.017782	2.105840e-07	0.002181	0.932583
b'KN'	9.275140e-06	-1.000000	0.160605	1.000000	1.000000	1.000000e+00	1.000000	0.081672
b'LR'	9.834693e-03	0.160605	-1.000000	1.000000	1.000000	7.694732e-01	1.000000	1.000000
b'ML'	5.367319e-01	1.000000	1.000000	-1.000000	1.000000	1.649189e-02	1.000000	1.000000
b'NB'	1.778204e-02	1.000000	1.000000	1.000000	-1.000000	5.080074e-01	1.000000	1.000000
b'RF'	2.105840e-07	1.000000	0.769473	0.016492	0.508007	-1.000000e+00	1.000000	0.007329
b'SV'	2.180707e-03	1.000000	1.000000	1.000000	1.000000	1.000000e+00	-1.000000	1.000000
b'XG'	9.325833e-01	0.081672	1.000000	1.000000	1.000000	7.328697e-03	1.000000	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [618]: ph.sign_table(p_df)
```
Out[618]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	**	NS	*	***	**	NS
b'KN'	***	-	NS	NS	NS	NS	NS	NS
b'LR'	**	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	*	NS	NS
b'NB'	*	NS	NS	NS	-	NS	NS	NS
b'RF'	***	NS	NS	*	NS	-	NS	**
b'SV'	**	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	**	NS	-

Sensitivity

```
In [619]: p_df = get_p_df(_dict, 'sensitivity')
          p_df
```
Out[619]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	0.128456	0.255490	1.922285e-12	0.009355	0.039387	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	1.000000	1.000000	1.880957e-07	1.000000	1.000000	1.000000e+00
b'LR'	1.284560e-01	1.000000e+00	-1.000000	1.000000	9.037195e-05	1.000000	1.000000	1.000000e+00
b'ML'	2.554901e-01	1.000000e+00	1.000000	-1.000000	2.924471e-05	1.000000	1.000000	1.000000e+00
b'NB'	1.922285e-12	1.880957e-07	0.000090	0.000029	-1.000000e+00	0.002659	0.000484	7.527264e-09
b'RF'	9.354766e-03	1.000000e+00	1.000000	1.000000	2.659066e-03	-1.000000	1.000000	4.434257e-01
b'SV'	3.938663e-02	1.000000e+00	1.000000	1.000000	4.844420e-04	1.000000	-1.000000	1.000000e+00
b'XG'	1.000000e+00	1.000000e+00	1.000000	1.000000	7.527264e-09	0.443426	1.000000	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [620]: ph.sign_table(p_df)
```
Out[620]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	**	*	NS
b'KN'	NS	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	NS	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	**	***	***
b'RF'	**	NS	NS	NS	**	-	NS	NS
b'SV'	*	NS	NS	NS	***	NS	-	NS
b'XG'	NS	NS	NS	NS	***	NS	NS	-

Specificity

```
In [621]: p_df = get_p_df(_dict, 'specificity')
          p_df
```
Out[621]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	9.208091e-03	1.000000	1.000000	7.135352e-05	5.931973e-01	1.000000	1.000000
b'KN'	0.009208	-1.000000e+00	0.003993	0.000917	3.023554e-15	1.000000e+00	0.012524	0.016134
b'LR'	1.000000	3.993469e-03	-1.000000	1.000000	1.974802e-04	3.315959e-01	1.000000	1.000000
b'ML'	1.000000	9.171498e-04	1.000000	-1.000000	9.629733e-04	1.161607e-01	1.000000	1.000000
b'NB'	0.000071	3.023554e-15	0.000197	0.000963	-1.000000e+00	6.726362e-11	0.000048	0.000034
b'RF'	0.593197	1.000000e+00	0.331596	0.116161	6.726362e-11	-1.000000e+00	0.732697	0.870797
b'SV'	1.000000	1.252391e-02	1.000000	1.000000	4.783586e-05	7.326968e-01	-1.000000	1.000000
b'XG'	1.000000	1.613410e-02	1.000000	1.000000	3.403447e-05	8.707969e-01	1.000000	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [622]: ph.sign_table(p_df)
```
Out[622]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	NS	NS	***	NS	NS	NS
b'KN'	**	-	**	***	***	NS	*	*
b'LR'	NS	**	-	NS	***	NS	NS	NS
b'ML'	NS	***	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	NS	***	-	NS	NS
b'SV'	NS	*	NS	NS	***	NS	-	NS
b'XG'	NS	*	NS	NS	***	NS	NS	-

LR+

```
In [623]: p_df = get_p_df(_dict, 'LR_P')
          p_df
```
Out[623]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.287791e-05	1.000000	1.000000	1.000000e+00	3.448272e-04	1.000000	1.000000
b'KN'	0.000013	-1.000000e+00	0.019699	0.000785	7.242399e-09	1.000000e+00	0.078528	0.004447
b'LR'	1.000000	1.969883e-02	-1.000000	1.000000	9.383781e-02	1.840023e-01	1.000000	1.000000
b'ML'	1.000000	7.853529e-04	1.000000	-1.000000	9.219689e-01	1.215768e-02	1.000000	1.000000
b'NB'	1.000000	7.242399e-09	0.093838	0.921969	-1.000000e+00	4.457681e-07	0.024027	0.306092
b'RF'	0.000345	1.000000e+00	0.184002	0.012158	4.457681e-07	-1.000000e+00	0.572585	0.053014
b'SV'	1.000000	7.852773e-02	1.000000	1.000000	2.402667e-02	5.725850e-01	-1.000000	1.000000
b'XG'	1.000000	4.446951e-03	1.000000	1.000000	3.060924e-01	5.301399e-02	1.000000	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [624]: ph.sign_table(p_df)
```
Out[624]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	NS	NS	NS	***	NS	NS
b'KN'	***	-	*	***	***	NS	NS	**
b'LR'	NS	*	-	NS	NS	NS	NS	NS
b'ML'	NS	***	NS	-	NS	*	NS	NS
b'NB'	NS	***	NS	NS	-	***	*	NS
b'RF'	***	NS	NS	*	***	-	NS	NS
b'SV'	NS	NS	NS	NS	*	NS	-	NS
b'XG'	NS	**	NS	NS	NS	NS	NS	-

LR-

```
In [625]: p_df = get_p_df(_dict, 'LR_N')
          p_df
```
Out[625]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.014225	0.023633	0.229197	5.310337e-08	0.000031	0.005936	1.000000
b'KN'	1.422539e-02	-1.000000	1.000000	1.000000	3.194186e-01	1.000000	1.000000	1.000000
b'LR'	2.363275e-02	1.000000	-1.000000	1.000000	2.133402e-01	1.000000	1.000000	1.000000
b'ML'	2.291973e-01	1.000000	1.000000	-1.000000	2.165764e-02	0.730309	1.000000	1.000000
b'NB'	5.310337e-08	0.319419	0.213340	0.021658	-1.000000e+00	1.000000	0.597141	0.000430
b'RF'	3.135873e-05	1.000000	1.000000	0.730309	1.000000e+00	-1.000000	1.000000	0.040338
b'SV'	5.935917e-03	1.000000	1.000000	1.000000	5.971413e-01	1.000000	-1.000000	1.000000
b'XG'	1.000000e+00	1.000000	1.000000	1.000000	4.299803e-04	0.040338	1.000000	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [626]: ph.sign_table(p_df)
```
Out[626]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	*	NS	***	***	**	NS
b'KN'	*	-	NS	NS	NS	NS	NS	NS
b'LR'	*	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	*	NS	NS	NS
b'NB'	***	NS	NS	*	-	NS	NS	***
b'RF'	***	NS	NS	NS	NS	-	NS	*
b'SV'	**	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	***	*	NS	-

DOR

```
In [627]: p_df = get_p_df(_dict, 'DOR')
          p_df
```
Out[627]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	0.000009	0.091636	1.000000	0.053362	0.000002	0.01673	1.000000
b'KN'	0.000009	-1.000000	0.832116	0.032894	1.000000	1.000000	1.00000	0.030408
b'LR'	0.091636	0.832116	-1.000000	1.000000	1.000000	0.371049	1.00000	1.000000
b'ML'	1.000000	0.032894	1.000000	-1.000000	1.000000	0.010867	1.00000	1.000000
b'NB'	0.053362	1.000000	1.000000	1.000000	-1.000000	0.579787	1.00000	1.000000
b'RF'	0.000002	1.000000	0.371049	0.010867	0.579787	-1.000000	1.00000	0.009982
b'SV'	0.016730	1.000000	1.000000	1.000000	1.000000	1.000000	-1.00000	1.000000
b'XG'	1.000000	0.030408	1.000000	1.000000	1.000000	0.009982	1.00000	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [628]: ph.sign_table(p_df)
```
Out[628]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	***	NS	NS	NS	***	*	NS
b'KN'	***	-	NS	*	NS	NS	NS	*
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	*	NS	-	NS	*	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	***	NS	NS	*	NS	-	NS	**
b'SV'	*	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	*	NS	NS	NS	**	NS	-

SMOTE

F1-Score

```
In [629]: _dict = get_dict('SMOTE')
          p_df = get_p_df(_dict, 'f1_score')
          p_df
```
Out[629]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	0.223526	1.000000e+00	1.000000	5.841420e-05	0.014976	1.000000
b'KN'	1.000000	-1.000000e+00	0.000206	1.000000e+00	0.226623	1.364308e-09	0.000003	0.524819
b'LR'	0.223526	2.063944e-04	-1.000000	1.520018e-03	1.000000	1.000000e+00	1.000000	0.923997
b'ML'	1.000000	1.000000e+00	0.001520	-1.000000e+00	0.774982	2.484474e-08	0.000035	1.000000
b'NB'	1.000000	2.266232e-01	1.000000	7.749822e-01	-1.000000	2.411909e-03	0.229129	1.000000
b'RF'	0.000058	1.364308e-09	1.000000	2.484474e-08	0.002412	-1.000000e+00	1.000000	0.000671
b'SV'	0.014976	3.377365e-06	1.000000	3.523082e-05	0.229129	1.000000e+00	-1.000000	0.091320
b'XG'	1.000000	5.248187e-01	0.923997	1.000000e+00	1.000000	6.714547e-04	0.091320	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [630]: ph.sign_table(p_df)
```
Out[630]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	***	*	NS
b'KN'	NS	-	***	NS	NS	***	***	NS
b'LR'	NS	***	-	**	NS	NS	NS	NS
b'ML'	NS	NS	**	-	NS	***	***	NS
b'NB'	NS	NS	NS	NS	-	**	NS	NS
b'RF'	***	***	NS	***	**	-	NS	***
b'SV'	*	***	NS	***	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	***	NS	-

Sensitivity

```
In [631]: p_df = get_p_df(_dict, 'sensitivity')
          p_df
```
Out[631]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	5.155120e-02	1.000000	1.454651e-06	3.255409e-02	1.000000e+00	1.000000	1.000000
b'KN'	0.051551	-1.000000e+00	1.000000	5.549209e-01	5.553470e-09	1.465039e-02	0.750627	1.000000
b'LR'	1.000000	1.000000e+00	-1.000000	1.234137e-03	1.141747e-04	1.000000e+00	1.000000	1.000000
b'ML'	0.000001	5.549209e-01	0.001234	-1.000000e+00	9.937314e-17	1.875303e-07	0.000155	0.002846
b'NB'	0.032554	5.553470e-09	0.000114	9.937314e-17	-1.000000e+00	1.064868e-01	0.000938	0.000043
b'RF'	1.000000	1.465039e-02	1.000000	1.875303e-07	1.064868e-01	-1.000000e+00	1.000000	1.000000
b'SV'	1.000000	7.506272e-01	1.000000	1.545030e-04	9.377807e-04	1.000000e+00	-1.000000	1.000000
b'XG'	1.000000	1.000000e+00	1.000000	2.845659e-03	4.317451e-05	1.000000e+00	1.000000	-1.000000

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [632]: ph.sign_table(p_df)
```
Out[632]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	*	NS	NS	NS
b'KN'	NS	-	NS	NS	***	*	NS	NS
b'LR'	NS	NS	-	**	***	NS	NS	NS
b'ML'	***	NS	**	-	***	***	***	**
b'NB'	*	***	***	***	-	NS	***	***
b'RF'	NS	*	NS	***	NS	-	NS	NS
b'SV'	NS	NS	NS	***	***	NS	-	NS
b'XG'	NS	NS	NS	**	***	NS	NS	-

Specificity

```
In [633]: p_df = get_p_df(_dict, 'specificity')
          p_df
```
Out[633]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	3.265151e-03	2.497568e-08	1.506465e-01	2.153336e-04	2.125392e-04	1.000000
b'KN'	1.000000e+00	-1.000000e+00	7.996976e-03	1.002466e-07	7.352027e-02	6.025756e-04	5.951146e-04	1.000000
b'LR'	3.265151e-03	7.996976e-03	-1.000000e+00	6.422271e-01	8.995313e-10	1.000000e+00	1.000000e+00	0.604138
b'ML'	2.497568e-08	1.002466e-07	6.422271e-01	-1.000000e+00	1.416486e-17	1.000000e+00	1.000000e+00	0.000135
b'NB'	1.506465e-01	7.352027e-02	8.995313e-10	1.416486e-17	-1.000000e+00	1.108445e-11	1.085815e-11	0.000401
b'RF'	2.153336e-04	6.025756e-04	1.000000e+00	1.000000e+00	1.108445e-11	-1.000000e+00	1.000000e+00	0.098567
b'SV'	2.125392e-04	5.951146e-04	1.000000e+00	1.000000e+00	1.085815e-11	1.000000e+00	-1.000000e+00	0.097689
b'XG'	1.000000e+00	1.000000e+00	6.041379e-01	1.351158e-04	4.012520e-04	9.856747e-02	9.768881e-02	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [634]: ph.sign_table(p_df)
```
Out[634]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	***	NS	***	***	NS
b'KN'	NS	-	**	***	NS	***	***	NS
b'LR'	**	**	-	NS	***	NS	NS	NS
b'ML'	***	***	NS	-	***	NS	NS	***
b'NB'	NS	NS	***	***	-	***	***	***
b'RF'	***	***	NS	NS	***	-	NS	NS
b'SV'	***	***	NS	NS	***	NS	-	NS
b'XG'	NS	NS	NS	***	***	NS	NS	-

LR+

```
In [635]: p_df = get_p_df(_dict, 'LR_P')
          p_df
```
Out[635]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	3.086219e-03	0.011180	1.000000e+00	3.577452e-06	1.796677e-04	1.000000
b'KN'	1.000000	-1.000000e+00	3.679809e-05	0.000180	1.000000e+00	1.129558e-08	1.171866e-06	0.791948
b'LR'	0.003086	3.679809e-05	-1.000000e+00	1.000000	5.627293e-07	1.000000e+00	1.000000e+00	0.229232
b'ML'	0.011180	1.804571e-04	1.000000e+00	-1.000000	3.523371e-06	1.000000e+00	1.000000e+00	0.572709
b'NB'	1.000000	1.000000e+00	5.627293e-07	0.000004	-1.000000e+00	5.939598e-11	1.102960e-08	0.084231
b'RF'	0.000004	1.129558e-08	1.000000e+00	1.000000	5.939598e-11	-1.000000e+00	1.000000e+00	0.001378
b'SV'	0.000180	1.171866e-06	1.000000e+00	1.000000	1.102960e-08	1.000000e+00	-1.000000e+00	0.028100
b'XG'	1.000000	7.919478e-01	2.292319e-01	0.572709	8.423061e-02	1.377722e-03	2.809984e-02	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [636]: ph.sign_table(p_df)
```
Out[636]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	*	NS	***	***	NS
b'KN'	NS	-	***	***	NS	***	***	NS
b'LR'	**	***	-	NS	***	NS	NS	NS
b'ML'	*	***	NS	-	***	NS	NS	NS
b'NB'	NS	NS	***	***	-	***	***	NS
b'RF'	***	***	NS	NS	***	-	NS	**
b'SV'	***	***	NS	NS	***	NS	-	*
b'XG'	NS	NS	NS	NS	NS	**	*	-

LR-

```
In [637]: p_df = get_p_df(_dict, 'LR_N')
          p_df
```
Out[637]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	0.097008	1.000000	9.431139e-03	4.640790e-01	2.856152e-01	1.000000	1.000000
b'KN'	0.097008	-1.000000	0.016057	1.000000e+00	2.918014e-06	1.111769e-06	0.001049	0.896807
b'LR'	1.000000	0.016057	-1.000000	1.127846e-03	1.000000e+00	1.000000e+00	1.000000	1.000000
b'ML'	0.009431	1.000000	0.001128	-1.000000e+00	6.201474e-08	2.113462e-08	0.000048	0.140429
b'NB'	0.464079	0.000003	1.000000	6.201474e-08	-1.000000e+00	1.000000e+00	1.000000	0.041930
b'RF'	0.285615	0.000001	1.000000	2.113462e-08	1.000000e+00	-1.000000e+00	1.000000	0.022783
b'SV'	1.000000	0.001049	1.000000	4.797214e-05	1.000000e+00	1.000000e+00	-1.000000	1.000000
b'XG'	1.000000	0.896807	1.000000	1.404293e-01	4.193019e-02	2.278265e-02	1.000000	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [638]: ph.sign_table(p_df)
```
Out[638]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	**	NS	NS	NS	NS
b'KN'	NS	-	*	NS	***	***	**	NS
b'LR'	NS	*	-	**	NS	NS	NS	NS
b'ML'	**	NS	**	-	***	***	***	NS
b'NB'	NS	***	NS	***	-	NS	NS	*
b'RF'	NS	***	NS	***	NS	-	NS	*
b'SV'	NS	**	NS	***	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	*	*	NS	-

DOR

```
In [639]: p_df = get_p_df(_dict, 'DOR')
          p_df
```
Out[639]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	9.200189e-01	0.272121	1.000000	1.000000	4.292128e-05	1.616810e-02	1.000000
b'KN'	0.920019	-1.000000e+00	0.000066	0.990441	0.201293	1.092343e-10	6.898442e-07	0.284093
b'LR'	0.272121	6.619912e-05	-1.000000	0.249518	1.000000	7.374203e-01	1.000000e+00	0.886446
b'ML'	1.000000	9.904407e-01	0.249518	-1.000000	1.000000	3.697271e-05	1.447808e-02	1.000000
b'NB'	1.000000	2.012934e-01	1.000000	1.000000	-1.000000	5.912346e-04	1.086051e-01	1.000000
b'RF'	0.000043	1.092343e-10	0.737420	0.000037	0.000591	-1.000000e+00	1.000000e+00	0.000348
b'SV'	0.016168	6.898442e-07	1.000000	0.014478	0.108605	1.000000e+00	-1.000000e+00	0.074361
b'XG'	1.000000	2.840931e-01	0.886446	1.000000	1.000000	3.480383e-04	7.436057e-02	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with astVerisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [640]: ph.sign_table(p_df)
```
Out[640]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	***	*	NS
b'KN'	NS	-	***	NS	NS	***	***	NS
b'LR'	NS	***	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	***	*	NS
b'NB'	NS	NS	NS	NS	-	***	NS	NS
b'RF'	***	***	NS	***	***	-	NS	***
b'SV'	*	***	NS	*	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	***	NS	-

SMOTE-Tomek

F1-Score

```
In [641]: _dict = get_dict('SMOTETomek')
          p_df = get_p_df(_dict, 'f1_score')
          p_df
```
Out[641]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	0.024098	1.000000e+00	1.000000	3.376495e-06	0.009256	1.000000
b'KN'	1.000000	-1.000000e+00	0.000054	1.000000e+00	0.023305	5.092067e-10	0.000015	0.243342
b'LR'	0.024098	5.425785e-05	-1.000000	2.641091e-04	1.000000	1.000000e+00	1.000000	0.915428
b'ML'	1.000000	1.000000e+00	0.000264	-1.000000e+00	0.072735	4.650830e-09	0.000078	0.610304
b'NB'	1.000000	2.330517e-02	1.000000	7.273522e-02	-1.000000	2.043845e-02	1.000000	1.000000
b'RF'	0.000003	5.092067e-10	1.000000	4.650830e-09	0.020438	-1.000000e+00	1.000000	0.001177
b'SV'	0.009256	1.466738e-05	1.000000	7.752071e-05	1.000000	1.000000e+00	-1.000000	0.467423
b'XG'	1.000000	2.433418e-01	0.915428	6.103042e-01	1.000000	1.177450e-03	0.467423	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [642]: ph.sign_table(p_df)
```
Out[642]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	NS	NS	***	**	NS
b'KN'	NS	-	***	NS	*	***	***	NS
b'LR'	*	***	-	***	NS	NS	NS	NS
b'ML'	NS	NS	***	-	NS	***	***	NS
b'NB'	NS	*	NS	NS	-	*	NS	NS
b'RF'	***	***	NS	***	*	-	NS	**
b'SV'	**	***	NS	***	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	**	NS	-

Sensitivity

```
In [643]: p_df = get_p_df(_dict, 'sensitivity')
          p_df
```
Out[643]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	1.000000	1.713679e-03	2.395138e-06	9.653715e-01	1.000000	1.000000
b'KN'	1.000000	-1.000000e+00	0.643513	1.802864e-01	8.866826e-10	1.900580e-02	0.772788	1.000000
b'LR'	1.000000	6.435133e-01	-1.000000	1.619635e-05	3.561417e-04	1.000000e+00	1.000000	1.000000
b'ML'	0.001714	1.802864e-01	0.000016	-1.000000e+00	2.166875e-19	2.578241e-08	0.000023	0.002236
b'NB'	0.000002	8.866826e-10	0.000356	2.166875e-19	-1.000000e+00	3.339895e-02	0.000257	0.000002
b'RF'	0.965372	1.900580e-02	1.000000	2.578241e-08	3.339895e-02	-1.000000e+00	1.000000	0.823824
b'SV'	1.000000	7.727880e-01	1.000000	2.332224e-05	2.570014e-04	1.000000e+00	-1.000000	1.000000
b'XG'	1.000000	1.000000e+00	1.000000	2.236410e-03	1.684024e-06	8.238239e-01	1.000000	-1.000000

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [644]: ph.sign_table(p_df)
```
Out[644]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	**	***	NS	NS	NS
b'KN'	NS	-	NS	NS	***	*	NS	NS
b'LR'	NS	NS	-	***	***	NS	NS	NS
b'ML'	**	NS	***	-	***	***	***	**
b'NB'	***	***	***	***	-	*	***	***
b'RF'	NS	*	NS	***	*	-	NS	NS
b'SV'	NS	NS	NS	***	***	NS	-	NS
b'XG'	NS	NS	NS	**	***	NS	NS	-

Specificity

```
In [645]: p_df = get_p_df(_dict, 'specificity')
          p_df
```
Out[645]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	2.901812e-01	5.512080e-06	3.990190e-03	2.687331e-03	7.471323e-02	1.000000e+00
b'KN'	1.000000	-1.000000e+00	1.183226e-02	1.981172e-08	1.256595e-01	3.242997e-05	2.049246e-03	9.236439e-02
b'LR'	0.290181	1.183226e-02	-1.000000e+00	2.329441e-01	5.389176e-09	1.000000e+00	1.000000e+00	1.000000e+00
b'ML'	0.000006	1.981172e-08	2.329441e-01	-1.000000e+00	5.980864e-18	1.000000e+00	7.811607e-01	3.515520e-02
b'NB'	0.003990	1.256595e-01	5.389176e-09	5.980864e-18	-1.000000e+00	3.683109e-13	2.783647e-10	2.090342e-07
b'RF'	0.002687	3.242997e-05	1.000000e+00	1.000000e+00	3.683109e-13	-1.000000e+00	1.000000e+00	1.000000e+00
b'SV'	0.074713	2.049246e-03	1.000000e+00	7.811607e-01	2.783647e-10	1.000000e+00	-1.000000e+00	1.000000e+00
b'XG'	1.000000	9.236439e-02	1.000000e+00	3.515520e-02	2.090342e-07	1.000000e+00	1.000000e+00	-1.000000e+00

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [646]: ph.sign_table(p_df)
```
Out[646]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	***	**	**	NS	NS
b'KN'	NS	-	*	***	NS	***	**	NS
b'LR'	NS	*	-	NS	***	NS	NS	NS
b'ML'	***	***	NS	-	***	NS	NS	*
b'NB'	**	NS	***	***	-	***	***	***
b'RF'	**	***	NS	NS	***	-	NS	NS
b'SV'	NS	**	NS	NS	***	NS	-	NS
b'XG'	NS	NS	NS	*	***	NS	NS	-

LR+

```
In [647]: p_df = get_p_df(_dict, 'LR_P')
          p_df
```
Out[647]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	6.113793e-03	0.120024	1.000000e+00	3.576959e-06	1.007304e-03	1.000000
b'KN'	1.000000	-1.000000e+00	4.843237e-06	0.000324	1.000000e+00	2.703941e-10	4.204134e-07	0.016001
b'LR'	0.006114	4.843237e-06	-1.000000e+00	1.000000	8.579450e-07	1.000000e+00	1.000000e+00	1.000000
b'ML'	0.120024	3.236512e-04	1.000000e+00	-1.000000	7.384378e-05	4.277139e-01	1.000000e+00	1.000000
b'NB'	1.000000	1.000000e+00	8.579450e-07	0.000074	-1.000000e+00	2.956888e-11	6.527278e-08	0.004829
b'RF'	0.000004	2.703941e-10	1.000000e+00	0.427714	2.956888e-11	-1.000000e+00	1.000000e+00	0.021300
b'SV'	0.001007	4.204134e-07	1.000000e+00	1.000000	6.527278e-08	1.000000e+00	-1.000000e+00	0.746248
b'XG'	1.000000	1.600072e-02	1.000000e+00	1.000000	4.828672e-03	2.129962e-02	7.462476e-01	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [648]: ph.sign_table(p_df)
```
Out[648]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	NS	NS	***	**	NS
b'KN'	NS	-	***	***	NS	***	***	*
b'LR'	**	***	-	NS	***	NS	NS	NS
b'ML'	NS	***	NS	-	***	NS	NS	NS
b'NB'	NS	NS	***	***	-	***	***	**
b'RF'	***	***	NS	NS	***	-	NS	*
b'SV'	**	***	NS	NS	***	NS	-	NS
b'XG'	NS	*	NS	NS	**	*	NS	-

LR-

```
In [649]: p_df = get_p_df(_dict, 'LR_N')
          p_df
```
Out[649]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	0.518429	5.249511e-01	1.994841e-04	1.276760e-03	0.352138	1.000000
b'KN'	1.000000	-1.000000e+00	0.003632	1.000000e+00	6.985794e-08	8.046329e-07	0.002035	0.547665
b'LR'	0.518429	3.632016e-03	-1.000000	7.085734e-05	9.177916e-01	1.000000e+00	1.000000	1.000000
b'ML'	0.524951	1.000000e+00	0.000071	-1.000000e+00	2.210673e-10	3.629502e-09	0.000035	0.036736
b'NB'	0.000199	6.985794e-08	0.917792	2.210673e-10	-1.000000e+00	1.000000e+00	1.000000	0.008026
b'RF'	0.001277	8.046329e-07	1.000000	3.629502e-09	1.000000e+00	-1.000000e+00	1.000000	0.036617
b'SV'	0.352138	2.034533e-03	1.000000	3.526518e-05	1.000000e+00	1.000000e+00	-1.000000	1.000000
b'XG'	1.000000	5.476654e-01	1.000000	3.673618e-02	8.025570e-03	3.661742e-02	1.000000	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [650]: ph.sign_table(p_df)
```
Out[650]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	**	NS	NS
b'KN'	NS	-	**	NS	***	***	**	NS
b'LR'	NS	**	-	***	NS	NS	NS	NS
b'ML'	NS	NS	***	-	***	***	***	*
b'NB'	***	***	NS	***	-	NS	NS	**
b'RF'	**	***	NS	***	NS	-	NS	*
b'SV'	NS	**	NS	***	NS	NS	-	NS
b'XG'	NS	NS	NS	*	**	*	NS	-

DOR

```
In [651]: p_df = get_p_df(_dict, 'DOR')
          p_df
```
Out[651]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	0.022479	1.000000	1.000000	1.663546e-06	0.005766	1.000000
b'KN'	1.000000	-1.000000e+00	0.000013	1.000000	0.011744	3.185258e-11	0.000002	0.050108
b'LR'	0.022479	1.276492e-05	-1.000000	0.038073	1.000000	1.000000e+00	1.000000	1.000000
b'ML'	1.000000	1.000000e+00	0.038073	-1.000000	1.000000	3.782633e-06	0.010271	1.000000
b'NB'	1.000000	1.174395e-02	1.000000	1.000000	-1.000000	9.431167e-03	1.000000	1.000000
b'RF'	0.000002	3.185258e-11	1.000000	0.000004	0.009431	-1.000000e+00	1.000000	0.001853
b'SV'	0.005766	1.826569e-06	1.000000	0.010271	1.000000	1.000000e+00	-1.000000	0.631810
b'XG'	1.000000	5.010821e-02	1.000000	1.000000	1.000000	1.852828e-03	0.631810	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

```
In [652]: ph.sign_table(p_df)
```
Out[652]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	NS	NS	***	**	NS
b'KN'	NS	-	***	NS	*	***	***	NS
b'LR'	*	***	-	*	NS	NS	NS	NS
b'ML'	NS	NS	*	-	NS	***	*	NS
b'NB'	NS	*	NS	NS	-	**	NS	NS
b'RF'	***	***	NS	***	**	-	NS	**
b'SV'	**	***	NS	*	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	**	NS	-

Hospital Sírio Libanês DataSet

ADASYN

F1-Score

In [653]:
```
dataset = 'HSL'
file_path = f'{workspace}/{dataset}'

_dict = get_dict('ADASYN')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[653]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.012698	6.535693e-10	1.000000e+00	1.313439e-03	1.000000e+00	7.797815e-06	1.000000e+00
b'KN'	1.269775e-02	-1.000000	4.172280e-02	2.043337e-05	1.000000e+00	2.067642e-03	1.000000e+00	7.182778e-03
b'LR'	6.535693e-10	0.041723	-1.000000e+00	1.203249e-14	2.513709e-01	2.610388e-11	1.000000e+00	2.340473e-10
b'ML'	1.000000e+00	0.000020	1.203249e-14	-1.000000e+00	9.657207e-07	1.000000e+00	1.283170e-09	1.000000e+00
b'NB'	1.313439e-03	1.000000	2.513709e-01	9.657207e-07	-1.000000e+00	1.673230e-04	1.000000e+00	6.860229e-04
b'RF'	1.000000e+00	0.002068	2.610388e-11	1.000000e+00	1.673230e-04	-1.000000e+00	6.206928e-07	1.000000e+00
b'SV'	7.797815e-06	1.000000	1.000000e+00	1.283170e-09	1.000000e+00	6.206928e-07	-1.000000e+00	3.495217e-06
b'XG'	1.000000e+00	0.007183	2.340473e-10	1.000000e+00	6.860229e-04	1.000000e+00	3.495217e-06	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [654]:
```
ph.sign_table(p_df)
```

Out[654]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	***	NS	**	NS	***	NS
b'KN'	*	-	*	***	NS	**	NS	**
b'LR'	***	*	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	**	NS	NS	***	-	***	NS	***
b'RF'	NS	**	***	NS	***	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	***
b'XG'	NS	**	***	NS	***	NS	***	-

Sensitivity

In [655]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[655]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.015528	8.581101e-10	1.000000e+00	0.002090	1.000000e+00	4.792421e-06	1.000000e+00
b'KN'	1.552817e-02	-1.000000	3.976465e-02	2.019125e-05	1.000000	2.913782e-03	1.000000e+00	8.476654e-03
b'LR'	8.581101e-10	0.039765	-1.000000e+00	1.052295e-14	0.204611	4.293443e-11	1.000000e+00	2.859667e-10
b'ML'	1.000000e+00	0.000020	1.052295e-14	-1.000000e+00	0.000001	1.000000e+00	4.721543e-10	1.000000e+00
b'NB'	2.090390e-03	1.000000	2.046114e-01	1.306293e-06	-1.000000	3.189277e-04	1.000000e+00	1.056372e-03
b'RF'	1.000000e+00	0.002914	4.293443e-11	1.000000e+00	0.000319	-1.000000e+00	4.332825e-07	1.000000e+00
b'SV'	4.792421e-06	1.000000	1.000000e+00	4.721543e-10	1.000000	4.332825e-07	-1.000000e+00	1.992128e-06
b'XG'	1.000000e+00	0.008477	2.859667e-10	1.000000e+00	0.001056	1.000000e+00	1.992128e-06	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [656]:
```
ph.sign_table(p_df)
```

Out[656]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	***	NS	**	NS	***	NS
b'KN'	*	-	*	***	NS	**	NS	**
b'LR'	***	*	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	**	NS	NS	***	-	***	NS	**
b'RF'	NS	**	***	NS	***	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	***
b'XG'	NS	**	***	NS	**	NS	***	-

Specificity

In [657]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[657]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.002698	1.000000	1.000000	1.000000	0.000630	1.000000
b'KN'	1.000000	-1.000000	0.057893	1.000000	1.000000	1.000000	0.017575	1.000000
b'LR'	0.002698	0.057893	-1.000000	0.000090	0.089596	0.007364	1.000000	0.000491
b'ML'	1.000000	1.000000	0.000090	-1.000000	1.000000	1.000000	0.000017	1.000000
b'NB'	1.000000	1.000000	0.089596	1.000000	-1.000000	1.000000	0.028366	1.000000
b'RF'	1.000000	1.000000	0.007364	1.000000	1.000000	-1.000000	0.001864	1.000000
b'SV'	0.000630	0.017575	1.000000	0.000017	0.028366	0.001864	-1.000000	0.000101
b'XG'	1.000000	1.000000	0.000491	1.000000	1.000000	1.000000	0.000101	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [658]:
```
ph.sign_table(p_df)
```

Out[658]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	NS	NS	NS	***	NS
b'KN'	NS	-	NS	NS	NS	NS	*	NS
b'LR'	**	NS	-	***	NS	**	NS	***
b'ML'	NS	NS	***	-	NS	NS	***	NS
b'NB'	NS	NS	NS	NS	-	NS	*	NS
b'RF'	NS	NS	**	NS	NS	-	**	NS
b'SV'	***	*	NS	***	*	**	-	***
b'XG'	NS	NS	***	NS	NS	NS	***	-

LR+

In [659]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[659]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.524440	1.000000	1.000000	1.00000	0.028889	1.000000
b'KN'	1.000000	-1.000000	0.190090	1.000000	1.000000	1.00000	0.007697	1.000000
b'LR'	0.524440	0.190090	-1.000000	0.370633	0.241160	1.00000	1.000000	0.123762
b'ML'	1.000000	1.000000	0.370633	-1.000000	1.000000	1.00000	0.018311	1.000000
b'NB'	1.000000	1.000000	0.241160	1.000000	-1.000000	1.00000	0.010467	1.000000
b'RF'	1.000000	1.000000	1.000000	1.000000	1.000000	-1.00000	0.086670	1.000000
b'SV'	0.028889	0.007697	1.000000	0.018311	0.010467	0.08667	-1.000000	0.004438
b'XG'	1.000000	1.000000	0.123762	1.000000	1.000000	1.00000	0.004438	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [660]:
```
ph.sign_table(p_df)
```

Out[660]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	*	NS
b'KN'	NS	-	NS	NS	NS	NS	**	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	*	NS
b'NB'	NS	NS	NS	NS	-	NS	*	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	*	**	NS	*	*	NS	-	**
b'XG'	NS	NS	NS	NS	NS	NS	**	-

LR-

In [661]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

Out[661]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.000000	1.0	1.000000	1.000000	1.0	1.000000	1.000000
b'KN'	1.0	-1.000000	1.0	1.000000	1.000000	1.0	0.556584	1.000000
b'LR'	1.0	1.000000	-1.0	1.000000	1.000000	1.0	1.000000	1.000000
b'ML'	1.0	1.000000	1.0	-1.000000	1.000000	1.0	0.847004	1.000000
b'NB'	1.0	1.000000	1.0	1.000000	-1.000000	1.0	0.404753	1.000000
b'RF'	1.0	1.000000	1.0	1.000000	1.000000	-1.0	1.000000	1.000000
b'SV'	1.0	0.556584	1.0	0.847004	0.404753	1.0	-1.000000	0.700627
b'XG'	1.0	1.000000	1.0	1.000000	1.000000	1.0	0.700627	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [662]:
```
ph.sign_table(p_df)
```

Out[662]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

DOR

In [663]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```

Out[663]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	0.403753	1.000000
b'KN'	1.000000	-1.000000	1.000000	1.000000	1.000000	1.000000	0.107777	1.000000
b'LR'	1.000000	1.000000	-1.000000	0.845086	1.000000	1.000000	1.000000	0.954187
b'ML'	1.000000	1.000000	0.845086	-1.000000	1.000000	1.000000	0.061054	1.000000
b'NB'	1.000000	1.000000	1.000000	1.000000	-1.000000	1.000000	0.105194	1.000000
b'RF'	1.000000	1.000000	1.000000	1.000000	1.000000	-1.000000	0.323357	1.000000
b'SV'	0.403753	0.107777	1.000000	0.061054	0.105194	0.323357	-1.000000	0.071734
b'XG'	1.000000	1.000000	0.954187	1.000000	1.000000	1.000000	0.071734	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [664]:
```
ph.sign_table(p_df)
```

Out[664]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

ORIGINAL

F1-Score

In [665]:
```
_dict = get_dict('ORIGINAL')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[665]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	9.527668e-13	1.000000e+00	1.000000e+00	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	2.755039e-01	1.000000e+00	2.621247e-20	1.000000e+00	1.000000e+00	1.000000e+00
b'LR'	1.000000e+00	2.755039e-01	-1.000000e+00	1.000000e+00	7.050602e-11	2.755039e-01	2.755039e-01	1.000000e+00
b'ML'	1.000000e+00	1.000000e+00	1.000000e+00	-1.000000e+00	7.432985e-17	1.000000e+00	1.000000e+00	1.000000e+00
b'NB'	9.527668e-13	2.621247e-20	7.050602e-11	7.432985e-17	-1.000000e+00	2.621247e-20	2.621247e-20	3.283055e-16
b'RF'	1.000000e+00	1.000000e+00	2.755039e-01	1.000000e+00	2.621247e-20	-1.000000e+00	1.000000e+00	1.000000e+00
b'SV'	1.000000e+00	1.000000e+00	2.755039e-01	1.000000e+00	2.621247e-20	1.000000e+00	-1.000000e+00	1.000000e+00
b'XG'	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	3.283055e-16	1.000000e+00	1.000000e+00	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [666]:
```
ph.sign_table(p_df)
```

Out[666]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	NS	NS	NS
b'KN'	NS	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	NS	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	NS	***	-	NS	NS
b'SV'	NS	NS	NS	NS	***	NS	-	NS
b'XG'	NS	NS	NS	NS	***	NS	NS	-

Sensitivity

In [667]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[667]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	3.154965e-13	1.000000e+00	1.000000e+00	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	1.017500e-02	1.000000e+00	5.316656e-21	1.000000e+00	1.000000e+00	1.000000e+00
b'LR'	1.000000e+00	1.017500e-02	-1.000000e+00	1.966863e-01	1.775285e-08	1.017500e-02	1.017500e-02	3.230702e-01
b'ML'	1.000000e+00	1.000000e+00	1.966863e-01	-1.000000e+00	1.916189e-17	1.000000e+00	1.000000e+00	1.000000e+00
b'NB'	3.154965e-13	5.316656e-21	1.775285e-08	1.916189e-17	-1.000000e+00	5.316656e-21	5.316656e-21	8.683572e-17
b'RF'	1.000000e+00	1.000000e+00	1.017500e-02	1.000000e+00	5.316656e-21	-1.000000e+00	1.000000e+00	1.000000e+00
b'SV'	1.000000e+00	1.000000e+00	1.017500e-02	1.000000e+00	5.316656e-21	1.000000e+00	-1.000000e+00	1.000000e+00
b'XG'	1.000000e+00	1.000000e+00	3.230702e-01	1.000000e+00	8.683572e-17	1.000000e+00	1.000000e+00	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [668]:
```
ph.sign_table(p_df)
```

Out[668]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	NS	NS	NS
b'KN'	NS	-	*	NS	***	NS	NS	NS
b'LR'	NS	*	-	NS	***	*	*	NS
b'ML'	NS	NS	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	*	NS	***	-	NS	NS
b'SV'	NS	NS	*	NS	***	NS	-	NS
b'XG'	NS	NS	NS	NS	***	NS	NS	-

Specificity

In [669]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[669]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.009158	1.000000	1.000000	1.000000	1.000000	1.000000
b'KN'	1.000000	-1.000000	0.009158	1.000000	1.000000	1.000000	1.000000	1.000000
b'LR'	0.009158	0.009158	-1.000000	0.009158	0.208706	0.009158	0.009158	0.009158
b'ML'	1.000000	1.000000	0.009158	-1.000000	1.000000	1.000000	1.000000	1.000000
b'NB'	1.000000	1.000000	0.208706	1.000000	-1.000000	1.000000	1.000000	1.000000
b'RF'	1.000000	1.000000	0.009158	1.000000	1.000000	-1.000000	1.000000	1.000000
b'SV'	1.000000	1.000000	0.009158	1.000000	1.000000	1.000000	-1.000000	1.000000
b'XG'	1.000000	1.000000	0.009158	1.000000	1.000000	1.000000	1.000000	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [670]:
```
ph.sign_table(p_df)
```

Out[670]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	NS	NS	NS	NS	NS
b'KN'	NS	-	**	NS	NS	NS	NS	NS
b'LR'	**	**	-	**	NS	**	**	**
b'ML'	NS	NS	**	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	**	NS	NS	-	NS	NS
b'SV'	NS	NS	**	NS	NS	NS	-	NS
b'XG'	NS	NS	**	NS	NS	NS	NS	-

LR+

In [671]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[671]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	1.826311e-10	1.000000e+00	1.000000e+00	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	1.000000e+00	1.000000e+00	3.235183e-17	1.000000e+00	1.000000e+00	1.000000e+00
b'LR'	1.000000e+00	1.000000e+00	-1.000000e+00	1.000000e+00	4.096304e-10	1.000000e+00	1.000000e+00	1.000000e+00
b'ML'	1.000000e+00	1.000000e+00	1.000000e+00	-1.000000e+00	4.065302e-14	1.000000e+00	1.000000e+00	1.000000e+00
b'NB'	1.826311e-10	3.235183e-17	4.096304e-10	4.065302e-14	-1.000000e+00	3.235183e-17	3.235183e-17	1.543902e-13
b'RF'	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	3.235183e-17	-1.000000e+00	1.000000e+00	1.000000e+00
b'SV'	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	3.235183e-17	1.000000e+00	-1.000000e+00	1.000000e+00
b'XG'	1.000000e+00	1.000000e+00	1.000000e+00	1.000000e+00	1.543902e-13	1.000000e+00	1.000000e+00	-1.000000e+00

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [672]:
```
ph.sign_table(p_df)
```

Out[672]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	***	NS	NS	NS
b'KN'	NS	-	NS	NS	***	NS	NS	NS
b'LR'	NS	NS	-	NS	***	NS	NS	NS
b'ML'	NS	NS	NS	-	***	NS	NS	NS
b'NB'	***	***	***	***	-	***	***	***
b'RF'	NS	NS	NS	NS	***	-	NS	NS
b'SV'	NS	NS	NS	NS	***	NS	-	NS
b'XG'	NS	NS	NS	NS	***	NS	NS	-

LR-

In [673]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

```
/home/phnarloch/anaconda3/lib/python3.7/site-packages/scikit_posthocs/_posthocs.py:332: RuntimeWarning: divide by zero encountered in true_divide
  B = (1. / x_lens.loc[i] + 1. / x_lens.loc[j])
```

Out[673]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	NaN	1.0	1.0	1.0	NaN	NaN	1.0
b'KN'	NaN	-1.0	NaN	NaN	NaN	NaN	NaN	NaN
b'LR'	1.0	NaN	-1.0	1.0	1.0	NaN	NaN	1.0
b'ML'	1.0	NaN	1.0	-1.0	1.0	NaN	NaN	1.0
b'NB'	1.0	NaN	1.0	1.0	-1.0	NaN	NaN	1.0
b'RF'	NaN	NaN	NaN	NaN	NaN	-1.0	NaN	NaN
b'SV'	NaN	NaN	NaN	NaN	NaN	NaN	-1.0	NaN
b'XG'	1.0	NaN	1.0	1.0	1.0	NaN	NaN	-1.0

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [674]:
```
ph.sign_table(p_df)
```

Out[674]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NaN	NS	NS	NS	NaN	NaN	NS
b'KN'	NaN	-	NaN	NaN	NaN	NaN	NaN	NaN
b'LR'	NS	NaN	-	NS	NS	NaN	NaN	NS
b'ML'	NS	NaN	NS	-	NS	NaN	NaN	NS
b'NB'	NS	NaN	NS	NS	-	NaN	NaN	NS
b'RF'	NaN	NaN	NaN	NaN	NaN	-	NaN	NaN
b'SV'	NaN	NaN	NaN	NaN	NaN	NaN	-	NaN
b'XG'	NS	NaN	NS	NS	NS	NaN	NaN	-

DOR

In [675]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```

```
/home/phnarloch/anaconda3/lib/python3.7/site-packages/scikit_posthocs/_posthocs.py:332: RuntimeWarning: divide by zero encountered in true_divide
  B = (1. / x_lens.loc[i] + 1. / x_lens.loc[j])
```

Out[675]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	NaN	1.0	1.0	1.0	NaN	NaN	1.0
b'KN'	NaN	-1.0	NaN	NaN	NaN	NaN	NaN	NaN
b'LR'	1.0	NaN	-1.0	1.0	1.0	NaN	NaN	1.0
b'ML'	1.0	NaN	1.0	-1.0	1.0	NaN	NaN	1.0
b'NB'	1.0	NaN	1.0	1.0	-1.0	NaN	NaN	1.0
b'RF'	NaN	NaN	NaN	NaN	NaN	-1.0	NaN	NaN
b'SV'	NaN	NaN	NaN	NaN	NaN	NaN	-1.0	NaN
b'XG'	1.0	NaN	1.0	1.0	1.0	NaN	NaN	-1.0

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [676]:
```
ph.sign_table(p_df)
```

Out[676]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NaN	NS	NS	NS	NaN	NaN	NS
b'KN'	NaN	-	NaN	NaN	NaN	NaN	NaN	NaN
b'LR'	NS	NaN	-	NS	NS	NaN	NaN	NS
b'ML'	NS	NaN	NS	-	NS	NaN	NaN	NS
b'NB'	NS	NaN	NS	NS	-	NaN	NaN	NS
b'RF'	NaN	NaN	NaN	NaN	NaN	-	NaN	NaN
b'SV'	NaN	NaN	NaN	NaN	NaN	NaN	-	NaN
b'XG'	NS	NaN	NS	NS	NS	NaN	NaN	-

ROS

F1-Score

In [677]:
```
_dict = get_dict('ROS')
p_df = get_p_df(_dict, 'f1_score')
p_df
```

Out[677]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	8.204870e-11	1.000000e+00	1.429199e-07	1.000000e+00	2.790543e-10	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	2.267943e-10	1.000000e+00	3.364838e-07	1.000000e+00	7.525831e-10	1.000000e+00
b'LR'	8.204870e-11	2.267943e-10	-1.000000e+00	1.187908e-07	1.000000e+00	3.060290e-14	1.000000e+00	5.339947e-09
b'ML'	1.000000e+00	1.000000e+00	1.187908e-07	-1.000000e+00	6.068603e-05	9.025596e-01	3.346519e-07	1.000000e+00
b'NB'	1.429199e-07	3.364838e-07	1.000000e+00	6.068603e-05	-1.000000e+00	1.691807e-10	1.000000e+00	4.711766e-06
b'RF'	1.000000e+00	1.000000e+00	3.060290e-14	9.025596e-01	1.691807e-10	-1.000000e+00	1.242534e-13	1.000000e+00
b'SV'	2.790543e-10	7.525831e-10	1.000000e+00	3.346519e-07	1.000000e+00	1.242534e-13	-1.000000e+00	1.636106e-08
b'XG'	1.000000e+00	1.000000e+00	5.339947e-09	1.000000e+00	4.711766e-06	1.000000e+00	1.636106e-08	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [678]:
```
ph.sign_table(p_df)
```

Out[678]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	***	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	***	***	-	***	NS	***	NS	***
b'ML'	NS	NS	***	-	***	NS	***	NS
b'NB'	***	***	NS	***	-	***	NS	***
b'RF'	NS	NS	***	NS	***	-	***	NS
b'SV'	***	***	NS	***	NS	***	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

Sensitivity

In [679]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```

Out[679]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	6.758031e-11	1.000000e+00	1.722660e-07	1.000000e+00	3.704051e-10	1.000000e+00
b'KN'	1.000000e+00	-1.000000e+00	6.668679e-11	1.000000e+00	1.703591e-07	1.000000e+00	3.656696e-10	1.000000e+00
b'LR'	6.758031e-11	6.668679e-11	-1.000000e+00	9.136364e-08	1.000000e+00	1.508933e-14	1.000000e+00	7.018031e-09
b'ML'	1.000000e+00	1.000000e+00	9.136364e-08	-1.000000e+00	6.534997e-05	8.097095e-01	3.867972e-07	1.000000e+00
b'NB'	1.722660e-07	1.703591e-07	1.000000e+00	6.534997e-05	-1.000000e+00	1.388714e-10	1.000000e+00	8.073094e-06
b'RF'	1.000000e+00	1.000000e+00	1.508933e-14	8.097095e-01	1.388714e-10	-1.000000e+00	1.073205e-13	1.000000e+00
b'SV'	3.704051e-10	3.656696e-10	1.000000e+00	3.867972e-07	1.000000e+00	1.073205e-13	-1.000000e+00	3.272485e-08
b'XG'	1.000000e+00	1.000000e+00	7.018031e-09	1.000000e+00	8.073094e-06	1.000000e+00	3.272485e-08	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [680]:
```
ph.sign_table(p_df)
```

Out[680]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	***	NS	***	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	***	***	-	***	NS	***	NS	***
b'ML'	NS	NS	***	-	***	NS	***	NS
b'NB'	***	***	NS	***	-	***	NS	***
b'RF'	NS	NS	***	NS	***	-	***	NS
b'SV'	***	***	NS	***	NS	***	-	***
b'XG'	NS	NS	***	NS	***	NS	***	-

Specificity

In [681]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```

Out[681]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.000000e+00	1.358939e-07	1.000000	0.001445	1.000000e+00	2.211954e-06	1.000000
b'KN'	1.000000e+00	-1.000000e+00	1.004056e-10	1.000000	0.000007	1.000000e+00	2.746134e-09	1.000000
b'LR'	1.358939e-07	1.004056e-10	-1.000000e+00	0.000015	1.000000	4.436153e-08	1.000000e+00	0.000009
b'ML'	1.000000e+00	1.000000e+00	1.511083e-05	-1.000000	0.037460	1.000000e+00	1.659999e-04	1.000000
b'NB'	1.445076e-03	7.344352e-06	1.000000e+00	0.037460	-1.000000	6.496148e-04	1.000000e+00	0.027223
b'RF'	1.000000e+00	1.000000e+00	4.436153e-08	1.000000	0.000650	-1.000000e+00	7.870919e-07	1.000000
b'SV'	2.211954e-06	2.746134e-09	1.000000e+00	0.000166	1.000000	7.870919e-07	-1.000000e+00	0.000108
b'XG'	1.000000e+00	1.000000e+00	9.393304e-06	1.000000	0.027223	1.000000e+00	1.076440e-04	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [682]:
```
ph.sign_table(p_df)
```

Out[682]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	**	NS	***	NS
b'KN'	NS	-	***	NS	***	NS	***	NS
b'LR'	***	***	-	***	NS	***	NS	***
b'ML'	NS	NS	***	-	*	NS	***	NS
b'NB'	**	***	NS	*	-	***	NS	*
b'RF'	NS	NS	***	NS	***	-	***	NS
b'SV'	***	***	NS	***	NS	***	-	***
b'XG'	NS	NS	***	NS	*	NS	***	-

LR+

In [683]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```

Out[683]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000e+00	4.105551e-04	1.000000	0.438209	1.000000	0.003882	1.000000
b'KN'	1.000000	-1.000000e+00	8.244663e-07	1.000000	0.007990	1.000000	0.000014	1.000000
b'LR'	0.000411	8.244663e-07	-1.000000e+00	0.003613	1.000000	0.003738	1.000000	0.003104
b'ML'	1.000000	1.000000e+00	3.613402e-03	-1.000000	1.000000	1.000000	0.026553	1.000000
b'NB'	0.438209	7.989900e-03	1.000000e+00	1.000000	-1.000000	1.000000	1.000000	1.000000
b'RF'	1.000000	1.000000e+00	3.738290e-03	1.000000	1.000000	-1.000000	0.027358	1.000000
b'SV'	0.003882	1.432826e-05	1.000000e+00	0.026553	1.000000	0.027358	-1.000000	0.023236
b'XG'	1.000000	1.000000e+00	3.104422e-03	1.000000	1.000000	1.000000	0.023236	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [684]:
```
ph.sign_table(p_df)
```

Out[684]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	**	NS
b'KN'	NS	-	***	NS	**	NS	***	NS
b'LR'	***	***	-	**	NS	**	NS	**
b'ML'	NS	NS	**	-	NS	NS	*	NS
b'NB'	NS	**	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	**	NS	NS	-	*	NS
b'SV'	**	***	NS	*	NS	*	-	*
b'XG'	NS	NS	**	NS	NS	NS	*	-

LR-

In [685]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```

Out[685]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.317446	1.000000	1.000000	1.000000	0.639638	1.000000
b'KN'	1.000000	-1.000000	0.000272	0.807409	0.013683	1.000000	0.000879	0.362896
b'LR'	0.317446	0.000272	-1.000000	0.706109	1.000000	0.193521	1.000000	1.000000
b'ML'	1.000000	0.807409	0.706109	-1.000000	1.000000	1.000000	1.000000	1.000000
b'NB'	1.000000	0.013683	1.000000	1.000000	-1.000000	1.000000	1.000000	1.000000
b'RF'	1.000000	1.000000	0.193521	1.000000	1.000000	-1.000000	0.402892	1.000000
b'SV'	0.639638	0.000879	1.000000	1.000000	1.000000	0.402892	-1.000000	1.000000
b'XG'	1.000000	0.362896	1.000000	1.000000	1.000000	1.000000	1.000000	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [686]:
```
ph.sign_table(p_df)
```

Out[686]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	***	NS	*	NS	***	NS
b'LR'	NS	***	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	*	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	***	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

DOR

In [687]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```

Out[687]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.017349	1.000000	1.000000	1.000000	0.063377	1.000000
b'KN'	1.000000	-1.000000	0.000012	1.000000	0.006177	1.000000	0.000080	0.865860
b'LR'	0.017349	0.000012	-1.000000	0.074101	1.000000	0.018399	1.000000	0.104998
b'ML'	1.000000	1.000000	0.074101	-1.000000	1.000000	1.000000	0.239117	1.000000
b'NB'	1.000000	0.006177	1.000000	1.000000	-1.000000	1.000000	1.000000	1.000000
b'RF'	1.000000	1.000000	0.018399	1.000000	1.000000	-1.000000	0.066071	1.000000
b'SV'	0.063377	0.000080	1.000000	0.239117	1.000000	0.066071	-1.000000	0.326418
b'XG'	1.000000	0.865860	0.104998	1.000000	1.000000	1.000000	0.326418	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [688]:
```
ph.sign_table(p_df)
```

Out[688]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	*	NS	NS	NS	NS	NS
b'KN'	NS	-	***	NS	**	NS	***	NS
b'LR'	*	***	-	NS	NS	*	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	**	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	*	NS	NS	-	NS	NS
b'SV'	NS	***	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

RUS

F1-Score

In [689]:
```
_dict = get_dict('RUS')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[689]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.000000	1.000000	1.000000	1.000000	1.0	1.000000	1.0
b'KN'	1.0	-1.000000	0.005217	1.000000	1.000000	1.0	0.013641	1.0
b'LR'	1.0	0.005217	-1.000000	0.706114	0.229794	1.0	1.000000	1.0
b'ML'	1.0	1.000000	0.706114	-1.000000	1.000000	1.0	1.000000	1.0
b'NB'	1.0	1.000000	0.229794	1.000000	-1.000000	1.0	0.466325	1.0
b'RF'	1.0	1.000000	1.000000	1.000000	1.000000	-1.0	1.000000	1.0
b'SV'	1.0	0.013641	1.000000	1.000000	0.466325	1.0	-1.000000	1.0
b'XG'	1.0	1.000000	1.000000	1.000000	1.000000	1.0	1.000000	-1.0

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [690]:
```
ph.sign_table(p_df)
```
Out[690]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	**	NS	NS	NS	*	NS
b'LR'	NS	**	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	*	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

Sensitivity

In [691]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[691]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.000000	1.000000	1.000000	1.000000	1.0	1.000000	1.0
b'KN'	1.0	-1.000000	0.007976	1.000000	1.000000	1.0	0.019001	1.0
b'LR'	1.0	0.007976	-1.000000	0.808052	0.237823	1.0	1.000000	1.0
b'ML'	1.0	1.000000	0.808052	-1.000000	1.000000	1.0	1.000000	1.0
b'NB'	1.0	1.000000	0.237823	1.000000	-1.000000	1.0	0.457611	1.0
b'RF'	1.0	1.000000	1.000000	1.000000	1.000000	-1.0	1.000000	1.0
b'SV'	1.0	0.019001	1.000000	1.000000	0.457611	1.0	-1.000000	1.0
b'XG'	1.0	1.000000	1.000000	1.000000	1.000000	1.0	1.000000	-1.0

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [692]:
```
ph.sign_table(p_df)
```
Out[692]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	**	NS	NS	NS	*	NS
b'LR'	NS	**	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	*	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

Specificity

In [693]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[693]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.0	0.67689	1.0	0.096473	1.0	1.0	1.0
b'KN'	1.000000	-1.0	1.00000	1.0	1.000000	1.0	1.0	1.0
b'LR'	0.676890	1.0	-1.00000	1.0	1.000000	1.0	1.0	1.0
b'ML'	1.000000	1.0	1.00000	-1.0	1.000000	1.0	1.0	1.0
b'NB'	0.096473	1.0	1.00000	1.0	-1.000000	1.0	1.0	1.0
b'RF'	1.000000	1.0	1.00000	1.0	1.000000	-1.0	1.0	1.0
b'SV'	1.000000	1.0	1.00000	1.0	1.000000	1.0	-1.0	1.0
b'XG'	1.000000	1.0	1.00000	1.0	1.000000	1.0	1.0	-1.0

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [694]:
```
ph.sign_table(p_df)
```
Out[694]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

LR+

In [695]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[695]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.183790	1.0	0.096412	1.0	1.0	1.0
b'KN'	1.000000	-1.000000	0.425616	1.0	0.235941	1.0	1.0	1.0
b'LR'	0.183790	0.425616	-1.000000	1.0	1.000000	1.0	1.0	1.0
b'ML'	1.000000	1.000000	1.000000	-1.0	1.000000	1.0	1.0	1.0
b'NB'	0.096412	0.235941	1.000000	1.0	-1.000000	1.0	1.0	1.0
b'RF'	1.000000	1.000000	1.000000	1.0	1.000000	-1.0	1.0	1.0
b'SV'	1.000000	1.000000	1.000000	1.0	1.000000	1.0	-1.0	1.0
b'XG'	1.000000	1.000000	1.000000	1.0	1.000000	1.0	1.0	-1.0

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [696]:
```
ph.sign_table(p_df)
```
Out[696]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

LR-

In [697]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[697]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.006692	1.000000	0.528727	1.000000	0.225359	1.000000
b'KN'	1.000000	-1.000000	0.000013	0.227434	0.005593	0.121012	0.001619	1.000000
b'LR'	0.006692	0.000013	-1.000000	0.518063	1.000000	0.795398	1.000000	0.042712
b'ML'	1.000000	0.227434	0.518063	-1.000000	1.000000	1.000000	1.000000	1.000000
b'NB'	0.528727	0.005593	1.000000	1.000000	-1.000000	1.000000	1.000000	1.000000
b'RF'	1.000000	0.121012	0.795398	1.000000	1.000000	-1.000000	1.000000	1.000000
b'SV'	0.225359	0.001619	1.000000	1.000000	1.000000	1.000000	-1.000000	0.892317
b'XG'	1.000000	1.000000	0.042712	1.000000	1.000000	1.000000	0.892317	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [698]:
```
ph.sign_table(p_df)
```
Out[698]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	NS	NS	NS	NS	NS
b'KN'	NS	-	***	NS	**	NS	**	NS
b'LR'	**	***	-	NS	NS	NS	NS	*
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	**	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	**	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	*	NS	NS	NS	NS	-

DOR

In [699]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[699]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.198917	1.0	0.106773	1.0	1.0	1.0
b'KN'	1.000000	-1.000000	0.302530	1.0	0.166746	1.0	1.0	1.0
b'LR'	0.198917	0.302530	-1.000000	1.0	1.000000	1.0	1.0	1.0
b'ML'	1.000000	1.000000	1.000000	-1.0	1.000000	1.0	1.0	1.0
b'NB'	0.106773	0.166746	1.000000	1.0	-1.000000	1.0	1.0	1.0
b'RF'	1.000000	1.000000	1.000000	1.0	1.000000	-1.0	1.0	1.0
b'SV'	1.000000	1.000000	1.000000	1.0	1.000000	1.0	-1.0	1.0
b'XG'	1.000000	1.000000	1.000000	1.0	1.000000	1.0	1.0	-1.0

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [700]:
```
ph.sign_table(p_df)
```
Out[700]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

SMOTE

F1-Score

In [701]:
```
_dict = get_dict('SMOTE')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[701]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.862238e-02	1.061968e-06	2.050664e-01	3.963046e-02	1.000000e+00	1.273552e-05	1.000000e+00
b'KN'	0.018622	-1.000000e+00	1.000000e+00	3.254993e-08	1.000000e+00	2.736326e-04	1.000000e+00	1.521627e-03
b'LR'	0.000001	1.000000e+00	-1.000000e+00	7.817370e-15	5.868200e-01	1.984375e-09	1.000000e+00	2.418097e-08
b'ML'	0.205066	3.254993e-08	7.817370e-15	-1.000000e+00	1.196546e-07	1.000000e+00	3.102630e-13	1.000000e+00
b'NB'	0.039630	1.000000e+00	5.868200e-01	1.196546e-07	-1.000000e+00	7.148467e-04	1.000000e+00	3.676067e-03
b'RF'	1.000000	2.736326e-04	1.984375e-09	1.000000e+00	7.148467e-04	-1.000000e+00	3.740774e-08	1.000000e+00
b'SV'	0.000013	1.000000e+00	1.000000e+00	3.102630e-13	1.000000e+00	3.740774e-08	-1.000000e+00	3.838681e-07
b'XG'	1.000000	1.521627e-03	2.418097e-08	1.000000e+00	3.676067e-03	1.000000e+00	3.838681e-07	-1.000000e+00

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [702]:
```
ph.sign_table(p_df)
```
Out[702]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	***	NS	*	NS	***	NS
b'KN'	*	-	NS	***	NS	***	NS	**
b'LR'	***	NS	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	*	NS	NS	***	-	***	NS	**
b'RF'	NS	***	***	NS	***	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	***
b'XG'	NS	**	***	NS	**	NS	***	-

Sensitivity

In [703]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[703]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	1.366069e-02	2.959397e-07	2.641213e-01	4.199876e-02	1.000000e+00	5.116504e-06	1.000000e+00
b'KN'	1.366069e-02	-1.000000e+00	7.135111e-01	3.297045e-08	1.000000e+00	2.474463e-04	1.000000e+00	2.259593e-03
b'LR'	2.959397e-07	7.135111e-01	-1.000000e+00	2.520058e-15	3.045445e-01	6.790049e-10	1.000000e+00	1.837155e-08
b'ML'	2.641213e-01	3.297045e-08	2.520058e-15	-1.000000e+00	2.211125e-07	1.000000e+00	1.575427e-13	9.037562e-01
b'NB'	4.199876e-02	1.000000e+00	3.045445e-01	2.211125e-07	-1.000000e+00	1.010476e-03	1.000000e+00	7.945588e-03
b'RF'	1.000000e+00	2.474463e-04	6.790049e-10	1.000000e+00	1.010476e-03	-1.000000e+00	1.880943e-08	1.000000e+00
b'SV'	5.116504e-06	1.000000e+00	1.000000e+00	1.575427e-13	1.000000e+00	1.880943e-08	-1.000000e+00	3.973046e-07
b'XG'	1.000000e+00	2.259593e-03	1.837155e-08	9.037562e-01	7.945588e-03	1.000000e+00	3.973046e-07	-1.000000e+00

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [704]:
```
ph.sign_table(p_df)
```
Out[704]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	*	***	NS	*	NS	***	NS
b'KN'	*	-	NS	***	NS	***	NS	**
b'LR'	***	NS	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	*	NS	NS	***	-	**	NS	**
b'RF'	NS	***	***	NS	**	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	***
b'XG'	NS	**	***	NS	**	NS	***	-

Specificity

In [705]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[705]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000e+00	0.424936	4.774264e-08	1.000000e+00	1.000000	1.000000e+00	0.000189	1.000000
b'KN'	4.249361e-01	-1.000000	9.064772e-03	9.525354e-02	1.000000	6.752527e-01	1.000000	1.000000
b'LR'	4.774264e-08	0.009065	-1.000000e+00	1.911719e-09	0.000012	1.369838e-07	1.000000	0.000077
b'ML'	1.000000e+00	0.095254	1.911719e-09	-1.000000e+00	1.000000	1.000000e+00	0.000016	1.000000
b'NB'	1.000000e+00	1.000000	1.184669e-05	1.000000e+00	-1.000000	1.000000e+00	0.011378	1.000000
b'RF'	1.000000e+00	0.675253	1.369838e-07	1.000000e+00	1.000000	-1.000000e+00	0.000420	1.000000
b'SV'	1.888379e-04	1.000000	1.000000e+00	1.585916e-05	0.011378	4.199127e-04	-1.000000	0.043226
b'XG'	1.000000e+00	1.000000	7.710321e-05	1.000000e+00	1.000000	1.000000e+00	0.043226	-1.000000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [706]:
```
ph.sign_table(p_df)
```
Out[706]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	***	NS
b'KN'	NS	-	**	NS	NS	NS	NS	NS
b'LR'	***	**	-	***	***	***	NS	***
b'ML'	NS	NS	***	-	NS	NS	***	NS
b'NB'	NS	NS	***	NS	-	NS	*	NS
b'RF'	NS	NS	***	NS	NS	-	***	NS
b'SV'	***	NS	NS	***	*	***	-	*
b'XG'	NS	NS	***	NS	NS	NS	*	-

LR+

In [707]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[707]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.000010	1.000000	1.000000	1.000000	0.024713	1.000000
b'KN'	1.000000	-1.000000	0.005562	1.000000	1.000000	1.000000	1.000000	1.000000
b'LR'	0.000010	0.005562	-1.000000	0.000596	0.000005	0.000293	1.000000	0.017935
b'ML'	1.000000	1.000000	0.000596	-1.000000	1.000000	1.000000	0.361980	1.000000
b'NB'	1.000000	1.000000	0.000005	1.000000	-1.000000	1.000000	0.014950	1.000000
b'RF'	1.000000	1.000000	0.000293	1.000000	1.000000	-1.000000	0.230783	1.000000
b'SV'	0.024713	1.000000	1.000000	0.361980	0.014950	0.230783	-1.000000	1.000000
b'XG'	1.000000	1.000000	0.017935	1.000000	1.000000	1.000000	1.000000	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [708]:
```
ph.sign_table(p_df)
```
Out[708]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	*	NS
b'KN'	NS	-	**	NS	NS	NS	NS	NS
b'LR'	***	**	-	***	***	***	NS	*
b'ML'	NS	NS	***	-	NS	NS	NS	NS
b'NB'	NS	NS	***	NS	-	NS	*	NS
b'RF'	NS	NS	***	NS	NS	-	NS	NS
b'SV'	*	NS	NS	NS	*	NS	-	NS
b'XG'	NS	NS	*	NS	NS	NS	NS	-

LR-

In [709]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[709]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.003527	1.000000	1.000000	1.000000	0.280233	1.000000
b'KN'	1.000000	-1.000000	0.568485	1.000000	1.000000	1.000000	1.000000	1.000000
b'LR'	0.003527	0.568485	-1.000000	0.001456	0.000689	0.007824	1.000000	0.531483
b'ML'	1.000000	1.000000	0.001456	-1.000000	1.000000	1.000000	0.148613	1.000000
b'NB'	1.000000	1.000000	0.000689	1.000000	-1.000000	1.000000	0.528726	1.000000
b'RF'	1.000000	1.000000	0.007824	1.000000	1.000000	-1.000000	0.491420	1.000000
b'SV'	0.280233	1.000000	1.000000	0.148613	0.528726	0.491420	-1.000000	1.000000
b'XG'	1.000000	1.000000	0.531483	1.000000	1.000000	1.000000	1.000000	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [710]:
```
ph.sign_table(p_df)
```
Out[710]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	**	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	**	NS	-	**	***	**	NS	NS
b'ML'	NS	NS	**	-	NS	NS	NS	NS
b'NB'	NS	NS	***	NS	-	NS	NS	NS
b'RF'	NS	NS	**	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

DOR

In [711]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[711]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.000000	0.000102	1.000000	1.000000	1.000000	0.049990	1.000000
b'KN'	1.000000	-1.000000	0.076376	1.000000	1.000000	1.000000	1.000000	1.000000
b'LR'	0.000102	0.076376	-1.000000	0.000034	0.000567	0.000241	1.000000	0.040419
b'ML'	1.000000	1.000000	0.000034	-1.000000	1.000000	1.000000	0.022743	1.000000
b'NB'	1.000000	1.000000	0.000567	1.000000	-1.000000	1.000000	0.164521	1.000000
b'RF'	1.000000	1.000000	0.000241	1.000000	1.000000	-1.000000	0.091415	1.000000
b'SV'	0.049990	1.000000	1.000000	0.022743	0.164521	0.091415	-1.000000	1.000000
b'XG'	1.000000	1.000000	0.040419	1.000000	1.000000	1.000000	1.000000	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with astVerisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [712]:
```
ph.sign_table(p_df)
```
Out[712]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	***	NS	NS	NS	*	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	***	NS	-	***	***	***	NS	*
b'ML'	NS	NS	***	-	NS	NS	*	NS
b'NB'	NS	NS	***	NS	-	NS	NS	NS
b'RF'	NS	NS	***	NS	NS	-	NS	NS
b'SV'	*	NS	NS	*	NS	NS	-	NS
b'XG'	NS	NS	*	NS	NS	NS	NS	-

SMOTE-Tomek

F1-Score

In [713]:
```
_dict = get_dict('SMOTETomek')
p_df = get_p_df(_dict, 'f1_score')
p_df
```
Out[713]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	0.006158	4.632434e-06	1.000000e+00	3.651396e-05	1.000000e+00	3.069437e-04	1.000000
b'KN'	0.006158	-1.000000	1.000000e+00	5.358977e-06	1.000000e+00	3.186858e-05	1.000000e+00	0.074211
b'LR'	0.000005	1.000000	-1.000000e+00	4.224258e-10	1.000000e+00	4.192041e-09	1.000000e+00	0.000154
b'ML'	1.000000	0.000005	4.224258e-10	-1.000000e+00	5.962149e-09	1.000000e+00	9.588080e-08	0.774848
b'NB'	0.000037	1.000000	1.000000e+00	5.962149e-09	-1.000000e+00	5.184709e-08	1.000000e+00	0.000932
b'RF'	1.000000	0.000032	4.192041e-09	1.000000e+00	5.184709e-08	-1.000000e+00	7.196660e-07	1.000000
b'SV'	0.000307	1.000000	1.000000e+00	9.588080e-08	1.000000e+00	7.196660e-07	-1.000000e+00	0.005850
b'XG'	1.000000	0.074211	1.536907e-04	7.748481e-01	9.316576e-04	1.000000e+00	5.850310e-03	-1.000000

F1-Score Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [714]:
```
ph.sign_table(p_df)
```
Out[714]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	***	NS	***	NS	***	NS
b'KN'	**	-	NS	***	NS	***	NS	NS
b'LR'	***	NS	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	***	NS	NS	***	-	***	NS	***
b'RF'	NS	***	***	NS	***	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	**
b'XG'	NS	NS	***	NS	***	NS	**	-

Sensitivity

In [715]:
```
p_df = get_p_df(_dict, 'sensitivity')
p_df
```
Out[715]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	0.009919	3.638406e-06	1.000000e+00	5.456561e-05	1.000000e+00	3.529580e-04	1.000000
b'KN'	0.009919	-1.000000	1.000000e+00	5.339275e-06	1.000000e+00	7.833516e-05	1.000000e+00	0.147051
b'LR'	0.000004	1.000000	-1.000000e+00	1.309134e-10	1.000000e+00	4.583160e-09	1.000000e+00	0.000192
b'ML'	1.000000	0.000005	1.309134e-10	-1.000000e+00	4.500192e-09	1.000000e+00	5.423385e-08	0.438141
b'NB'	0.000055	1.000000	1.000000e+00	4.500192e-09	-1.000000e+00	1.207181e-07	1.000000e+00	0.001947
b'RF'	1.000000	0.000078	4.583160e-09	1.000000e+00	1.207181e-07	-1.000000e+00	1.191200e-06	1.000000
b'SV'	0.000353	1.000000	1.000000e+00	5.423385e-08	1.000000e+00	1.191200e-06	-1.000000e+00	0.009403
b'XG'	1.000000	0.147051	1.920051e-04	4.381412e-01	1.947492e-03	1.000000e+00	9.402657e-03	-1.000000

Sensitivity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [716]:
```
ph.sign_table(p_df)
```
Out[716]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	**	***	NS	***	NS	***	NS
b'KN'	**	-	NS	***	NS	***	NS	NS
b'LR'	***	NS	-	***	NS	***	NS	***
b'ML'	NS	***	***	-	***	NS	***	NS
b'NB'	***	NS	NS	***	-	***	NS	**
b'RF'	NS	***	***	NS	***	-	***	NS
b'SV'	***	NS	NS	***	NS	***	-	**
b'XG'	NS	NS	***	NS	**	NS	**	-

Specificity

In [717]:
```
p_df = get_p_df(_dict, 'specificity')
p_df
```
Out[717]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.000000	1.0	0.372947	1.000000	1.000000	1.000000	1.000000	1.00000
b'KN'	1.000000	-1.0	1.000000	1.000000	1.000000	1.000000	1.000000	1.00000
b'LR'	0.372947	1.0	-1.000000	0.003461	0.341386	0.828256	1.000000	1.00000
b'ML'	1.000000	1.0	0.003461	-1.000000	1.000000	1.000000	0.197069	0.52923
b'NB'	1.000000	1.0	0.341386	1.000000	-1.000000	1.000000	1.000000	1.00000
b'RF'	1.000000	1.0	0.828256	1.000000	1.000000	-1.000000	1.000000	1.00000
b'SV'	1.000000	1.0	1.000000	0.197069	1.000000	1.000000	-1.000000	1.00000
b'XG'	1.000000	1.0	1.000000	0.529230	1.000000	1.000000	1.000000	-1.00000

Specificity Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [718]:
```
ph.sign_table(p_df)
```
Out[718]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	**	NS	NS	NS	NS
b'ML'	NS	NS	**	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

LR+

In [719]:
```
p_df = get_p_df(_dict, 'LR_P')
p_df
```
Out[719]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.0	1.000000	1.0	1.000000	1.000000	1.0	1.000000
b'KN'	1.0	-1.0	1.000000	1.0	1.000000	1.000000	1.0	1.000000
b'LR'	1.0	1.0	-1.000000	1.0	0.269538	1.000000	1.0	1.000000
b'ML'	1.0	1.0	1.000000	-1.0	1.000000	1.000000	1.0	1.000000
b'NB'	1.0	1.0	0.269538	1.0	-1.000000	0.455337	1.0	0.414225
b'RF'	1.0	1.0	1.000000	1.0	0.455337	-1.000000	1.0	1.000000
b'SV'	1.0	1.0	1.000000	1.0	1.000000	1.000000	-1.0	1.000000
b'XG'	1.0	1.0	1.000000	1.0	0.414225	1.000000	1.0	-1.000000

LR+ Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [720]:
```
ph.sign_table(p_df)
```
Out[720]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

LR-

In [721]:
```
p_df = get_p_df(_dict, 'LR_N')
p_df
```
Out[721]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.0	1.0	1.000000	1.00000	1.0	1.0	1.000000
b'KN'	1.0	-1.0	1.0	1.000000	1.00000	1.0	1.0	1.000000
b'LR'	1.0	1.0	-1.0	1.000000	1.00000	1.0	1.0	1.000000
b'ML'	1.0	1.0	1.0	-1.000000	1.00000	1.0	1.0	0.546892
b'NB'	1.0	1.0	1.0	1.000000	-1.00000	1.0	1.0	0.245850
b'RF'	1.0	1.0	1.0	1.000000	1.00000	-1.0	1.0	1.000000
b'SV'	1.0	1.0	1.0	1.000000	1.00000	1.0	-1.0	1.000000
b'XG'	1.0	1.0	1.0	0.546892	0.24585	1.0	1.0	-1.000000

LR- Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [722]:
```
ph.sign_table(p_df)
```
Out[722]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-

DOR

In [723]:
```
p_df = get_p_df(_dict, 'DOR')
p_df
```
Out[723]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-1.0	1.0	1.0	1.00000	1.000000	1.0	1.0	1.000000
b'KN'	1.0	-1.0	1.0	1.00000	1.000000	1.0	1.0	1.000000
b'LR'	1.0	1.0	-1.0	1.00000	1.000000	1.0	1.0	1.000000
b'ML'	1.0	1.0	1.0	-1.00000	1.000000	1.0	1.0	0.855690
b'NB'	1.0	1.0	1.0	1.00000	-1.000000	1.0	1.0	0.376073
b'RF'	1.0	1.0	1.0	1.00000	1.000000	-1.0	1.0	1.000000
b'SV'	1.0	1.0	1.0	1.00000	1.000000	1.0	-1.0	1.000000
b'XG'	1.0	1.0	1.0	0.85569	0.376073	1.0	1.0	-1.000000

DOR Significance table.

Returns table that can be used in a publication. P values are replaced with asterisks: * - p < 0.05, ** - p < 0.01, *** - p < 0.001.

In [724]:
```
ph.sign_table(p_df)
```
Out[724]:

	b'DT'	b'KN'	b'LR'	b'ML'	b'NB'	b'RF'	b'SV'	b'XG'
b'DT'	-	NS	NS	NS	NS	NS	NS	NS
b'KN'	NS	-	NS	NS	NS	NS	NS	NS
b'LR'	NS	NS	-	NS	NS	NS	NS	NS
b'ML'	NS	NS	NS	-	NS	NS	NS	NS
b'NB'	NS	NS	NS	NS	-	NS	NS	NS
b'RF'	NS	NS	NS	NS	NS	-	NS	NS
b'SV'	NS	NS	NS	NS	NS	NS	-	NS
b'XG'	NS	NS	NS	NS	NS	NS	NS	-