automobile   272/7(7)   23.16(3)   18.40(1)   24.14(5)   24.23(6)   23.90(4)   19.88(2)   fertility   109.07(6)   103.95(5)   111.83(7)   97.51(2)   96.98(1)   99.78(3)   102.26(4)   flow   102.86(7)   84.04(5)   71.73(3)   83.36(4)   67.93(2)   87.29(6)   59.15(1)   forest   141.64(7)   99.27(4)   101.36(6)   98.75(3)   98.24(1)   98.52(2)   99.68(5)   servo   55.11(7)   52.14(6)   45.64(1)   51.70(4)   51.96(5)   51.09(3)   50.50(2)   stump   111.84(7)   94.65(6)   92.49(5)   89.61(4)   81.98(1)   86.77(3)   82.35(2)   traffic   39.66(5)   34.83(3)   44.06(7)   34.86(4)   34.83(2)   32.15(1)   39.83(6)   wine.red   110.39(7)   81.47(4)   62.97(1)   85.90(6)   82.04(5)   81.38(3)   65.27(2)   wine.white   96.76(7)   80.25(4)   66.07(1)   85.90(6)   85.88(5)   80.07(3)   66.02(2)   Avg. Rank   (6.67)   (4.44)   (3.56)   (4.22)   (3.11)   (3.11)   (2.89)   Ridge   Best   LS   LSid   RSW   RSWid   RSWH   RSWHid   automobile   20.00(5)   2.25E+07(7)   1.14E+07(6)   18.62(3)   18.78(4)   18.22(2)   16.23(1)   forest   99.44(5)   2.11E+09(7)   3.72E+08(6)   89.24(2)   98.02(1)   98.36(3)   99.20(4)   strong   66.89(5)   6.00E+04(7)   302.43(6)   66.00(3)   66.69(4)   65.42(2)   57.15(1)   forest   99.44(5)   2.11E+09(7)   3.72E+08(6)   89.24(2)   98.02(1)   98.36(3)   99.20(4)   strong   87.71(5)   4.03E+06(7)   8.06E+04(6)   86.33(4)   85.19(2)   85.62(3)   79.15(1)   traffic   41.28(5)   5.17E+13(6)   1.06E+16(7)   39.06(4)   38.38(3)   38.31(2)   36.18(1)   40.84(1)   65.07(4)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.04(2)   64.82(2)   64.04(2)   64.04(2)   64.82(2)   64.04(2)   64.82(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.04(2)   64.	kNNR	Best	LS	LSid	RSW	RSWid	RSWH	RSWHid
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	automobile	27.27(7)	23.16(3)	18.40(1)	24.14(5)	24.23(6)	23.90(4)	19.88(2)
Forest   141.64(7)   99.27(4)   101.36(6)   98.75(3)   98.24(1)   98.52(2)   99.68(5)   servo   55.11(7)   52.14(6)   45.64(1)   51.70(4)   51.96(5)   51.09(3)   50.50(2)   slump   111.84(7)   94.65(6)   92.49(5)   89.61(4)   81.98(1)   86.77(3)   82.35(2)   traffic   39.66(5)   34.83(3)   44.06(7)   34.86(4)   34.83(2)   32.15(1)   39.83(6)   wine_red   110.39(7)   81.47(4)   62.97(1)   85.90(6)   82.04(5)   81.38(3)   65.27(2)   wine_white   96.76(7)   80.25(4)   66.07(1)   85.90(6)   85.88(5)   80.07(3)   66.40(2)   Avg. Rank   (6.67)   (4.44)   (3.56)   (4.22)   (3.11)   (3.11)   (2.89)   Ridge   Best   LS   LSid   RSW   RSWid   RSWH   RSWHidd   Routh   Ro	fertility	109.07(6)	103.95(5)	111.83(7)	97.51(2)			102.26(4)
Servo   S5.11(7)   S2.14(6)   45.64(1)   S1.70(4)   S1.96(5)   S1.09(3)   S0.50(2)   slump   111.84(7)   94.65(6)   92.49(5)   89.61(4)   81.98(1)   86.77(3)   82.35(2)   traffic   39.66(5)   34.83(3)   44.06(7)   34.86(4)   34.83(2)   32.15(1)   39.83(6)   wine.red   110.39(7)   81.47(4)   62.97(1)   85.90(6)   82.04(5)   81.38(3)   65.27(2)   wine.white   96.76(7)   80.25(4)   66.07(1)   85.96(6)   85.88(5)   80.07(3)   66.40(2)   Avg. Rank   (6.67)   (4.44)   (3.56)   (4.22)   (3.11)   (3.11)   (2.89)   Ridge   Best   LS   LSid   RSW   RSWid   RSWH   RSWHid   automobile   20.00(5) 2.25E+07(7)   1.14E+07(6)   18.62(3)   18.78(4)   18.22(2)   16.23(1)   fertility   104.17(5)   1.30E+13(6)   2.38E+13(7)   102.59(2)   103.98(4)   95.22(1)   103.98(3)   flow   66.89(5)   6.00E+04(7)   302.43(6)   66.00(3)   66.69(4)   65.42(2)   57.15(1)   forest   99.44(5)   2.11E+09(7)   3.72E+08(6)   98.24(2)   98.02(1)   98.36(3)   79.15(1)   raffic   41.28(5)   5.17E+13(6)   1.06E+16(7)   30.64(4)   46.84(1)   61.05(2)   61.10(3)   slump   87.71(5)   4.03E+06(7)   8.06E+04(6)   86.33(4)   85.19(2)   85.62(3)   79.15(1)   traffic   41.28(5)   5.17E+13(6)   1.00E+10(7)   73.00(3)   73.10(4)   72.93(2)   72.83(1)   Avg. Rank   (5.00)   (6.56)   (6.44)   (2.89)   (3.00)   (2.11)   (2.00)   Lasso   Best   LS   LSid   RSW   RSWHid   RSWHid   automobile   18.45(2)   23.65(7)   19.02(3)   19.62(6)   19.62(5)   19.39(4)   16.44(1)   fertility   92.95(3)   93.13(5)   110.25(7)   92.95(1)   92.95(1)   93.07(4)   96.93(6)   flow   66.66(5)   285.32(7)   117.76(6)   65.12(3)   66.16(4)   64.99(2)   57.16(1)   slump   86.85(5)   411.18(7)   137.06(6)   85.19(4)   84.63(2)   84.90(3)   79.17(1)   traffic   40.24(4)   2.06E+09(7)   4.45E+08(6)   35.20(3)   35.15(2)   34.86(1)   43.84(5)   4	flow	102.86(7)	84.04(5)	71.73(3)	83.36(4)	67.93(2)	87.29(6)	<b>59.15</b> (1)
Slump	forest	141.64(7)	99.27(4)	101.36(6)	98.75(3)	98.24(1)	98.52(2)	99.68(5)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	servo	55.11(7)	52.14(6)	<b>45.64</b> (1)	51.70(4)	51.96(5)	51.09(3)	50.50(2)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	slump	111.84(7)	94.65(6)	92.49(5)	89.61(4)	81.98(1)	86.77(3)	82.35(2)
wine.white   96.76(7)   80.25(4)   66.07(1)   85.96(6)   85.88(5)   80.07(3)   66.40(2)     Avg. Rank   (6.67)	traffic	39.66(5)	34.83(3)	44.06(7)	34.86(4)	34.83(2)	32.15(1)	39.83(6)
Rvg. Rank   (6.67)   (4.44)   (3.56)   (4.22)   (3.11)   (3.11)   (2.89)     Ridge   Best   LS   LSid   RSW   RSWid   RSWH RSWHid     automobile   20.00(5) 2.25E+07(7) 1.14E+07(6)   18.62(3)   18.78(4)   18.22(2)   16.23(1)     fertility   104.17(5) 1.30E+13(6) 2.38E+13(7)   102.59(2)   103.98(4)   95.22(1)   103.98(3)     flow   66.89(5) 6.00E+04(7)   302.43(6)   66.00(3)   66.69(4)   65.42(2)   57.15(1)     forest   99.44(5) 2.11E+09(7) 3.72E+08(6)   98.24(2)   98.02(1)   98.36(3)   99.20(4)     servo   62.27(5)   493.06(6)   699.74(7)   61.44(4)   60.84(1)   61.05(2)   61.10(3)     slump   87.71(5)   4.03E+06(7)   8.06E+04(6)   86.33(4)   85.19(2)   85.62(3)   79.15(1)     traffic   41.28(5) 5.17E+13(6)   1.06E+16(7)   39.06(4)   38.38(3)   38.31(2)   36.18(1)     wine_red   69.12(5)   4.17E+06(7)   1.34E+04(6)   64.81(1)   65.07(4)   64.82(2)   64.90(3)     wine_white   78.12(5)   8.17E+09(6)   1.00E+10(7)   73.00(3)   73.10(4)   72.93(2)   72.83(1)     Avg. Rank   (5.00)   (6.56)   (6.44)   (2.89)   (3.00)   (2.11)   (2.00)     Lasso   Best   LS   LSid   RSW   RSWid   RSWH   RSWHid     automobile   18.45(2)   23.65(7)   19.02(3)   19.62(6)   19.62(5)   19.39(4)   16.44(1)     fertility   92.95(3)   93.13(5)   110.25(7)   92.95(1)   92.95(1)   93.07(4)   96.93(6)     flow   66.66(5)   285.32(7)   117.76(6)   65.12(3)   66.16(4)   64.99(2)   57.16(1)     forest   99.65(6)   99.58(5)   101.48(7)   98.13(2)   98.02(1)   98.27(3)   99.33(4)     servo   102.02(7)   69.73(6)   65.18(5)   60.84(4)   60.61(3)   59.63(2)   56.87(1)     slump   86.85(5)   411.18(7)   137.06(6)   85.19(4)   84.63(2)   84.90(3)   79.17(1)     traffic   40.24(4) 2.06E+09(7)   4.45E+08(6)   35.19(4)   84.63(2)   84.90(3)   79.17(1)     traffic   40.24(4) 2.06E+09(7)   4.45E+08(6)   35.19(4)   84.63(2)   84.90(3)   79.17(1)     forest   96.71(5)   134.17(6)   626.27(7)   78.49(4)   75.95(3)   75.67(2)   65.63(1)     wine_red   96.71(5)   134.17(6)   626.27(7)   78.49(4)   75.95(3)   75.67(2)   65.63(1)     wine_white   95.58(7)   78.45(	wine_red	110.39(7)	81.47(4)	<b>62.97</b> (1)	85.90(6)	82.04(5)	81.38(3)	65.27(2)
Ridge	wine_white	96.76(7)	80.25(4)	<b>66.07</b> (1)	85.96(6)	85.88(5)	80.07(3)	66.40(2)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Avg. Rank	(6.67)	(4.44)	(3.56)	(4.22)	(3.11)	(3.11)	(2.89)
$ \begin{array}{c} {\rm fertility} & 104.17(5) \ 1.30E+13(6) \ 2.38E+13(7) \ 102.59(2) \ 103.98(4) \ 95.22(1) \ 103.98(3) \\ {\rm flow} & 66.89(5) \ 6.00E+04(7) \ 302.43(6) \ 66.00(3) \ 66.69(4) \ 65.42(2) \ 57.15(1) \\ {\rm forest} & 99.44(5) \ 2.11E+09(7) \ 3.72E+08(6) \ 98.24(2) \ 98.02(1) \ 98.36(3) \ 99.20(4) \\ {\rm servo} & 62.27(5) \ 493.06(6) \ 699.74(7) \ 61.44(4) \ 60.84(1) \ 61.05(2) \ 61.10(3) \\ {\rm slump} & 87.71(5) \ 4.03E+06(7) \ 8.06E+04(6) \ 86.33(4) \ 85.19(2) \ 85.62(3) \ 79.15(1) \\ {\rm traffic} & 41.28(5) \ 5.17E+13(6) \ 1.06E+16(7) \ 39.06(4) \ 38.38(3) \ 38.31(2) \ 36.18(1) \\ {\rm wine.red} & 69.12(5) \ 4.17E+06(7) \ 1.34E+04(6) \ 64.81(1) \ 65.07(4) \ 64.82(2) \ 64.90(3) \\ {\rm wine.white} & 78.12(5) \ 8.17E+09(6) \ 1.00E+10(7) \ 73.00(3) \ 73.10(4) \ 72.93(2) \ 72.83(1) \\ {\rm Avg. \ Rank} \ \ (5.00) \ \ \ (6.56) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Ridge	Best	LS	LSid	RSW	RSWid	RSWH	RSWHid
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	automobile	20.00(5)	2.25E+07(7)	1.14E+07(6)	18.62(3)	18.78(4)	18.22(2)	<b>16.23</b> (1)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	fertility	104.17(5)	1.30E+13(6)	2.38E+13(7)	102.59(2)	103.98(4)	<b>95.22</b> (1)	103.98(3)
servo         62.27(5)         493.06(6)         699.74(7)         61.44(4)         60.84(1)         61.05(2)         61.10(3)           slump         87.71(5)         4.03E+06(7)         8.06E+04(6)         86.33(4)         85.19(2)         85.62(3)         79.15(1)           traffic         41.28(5)         5.17E+13(6)         1.06E+16(7)         39.06(4)         38.38(3)         38.31(2)         36.18(1)           wine.red         69.12(5)         4.17E+06(7)         1.34E+04(6)         64.81(1)         65.07(4)         64.82(2)         64.90(3)           wine.red         69.12(5)         8.17E+09(6)         1.00E+10(7)         73.00(3)         73.10(4)         72.93(2)         72.83(1)           Avg. Rank         (5.00)         (6.56)         (6.44)         (2.89)         (3.00)         (2.11)         (2.00)           Lasso         Best         LS         LSid         RSW         RSWid         RSWH RSWHid           automobile         18.45(2)         23.65(7)         19.02(3)         19.26(6)         19.62(5)         19.39(4)         16.44(1)           fertility         92.95(3)         93.3(3)         110.25(7)         92.95(1)         92.95(1)         92.95(1)         92.95(1)         92.95(1)         92.95(1) <td>flow</td> <td>66.89(5)</td> <td>6.00E + 04(7)</td> <td>302.43(6)</td> <td>66.00(3)</td> <td>66.69(4)</td> <td>65.42(2)</td> <td>57.15(1)</td>	flow	66.89(5)	6.00E + 04(7)	302.43(6)	66.00(3)	66.69(4)	65.42(2)	57.15(1)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	forest	99.44(5)	2.11E+09(7)	3.72E+08(6)	98.24(2)	98.02(1)	98.36(3)	99.20(4)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	servo	62.27(5)	493.06(6)	699.74(7)	61.44(4)	60.84(1)	61.05(2)	61.10(3)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	slump	87.71(5)	4.03E + 06(7)	8.06E+04(6)	86.33(4)	85.19(2)	85.62(3)	<b>79.15</b> (1)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	traffic	41.28(5)	5.17E+13(6)	1.06E+16(7)	39.06(4)	38.38(3)	38.31(2)	<b>36.18</b> (1)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	wine_red	69.12(5)	4.17E+06(7)	1.34E+04(6)	64.81(1)	65.07(4)	64.82(2)	64.90(3)
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	wine_white	78.12(5)	8.17E+09(6)	1.00E+10(7)	73.00(3)	73.10(4)	72.93(2)	72.83(1)
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Avg. Rank	(5.00)	(6.56)	(6.44)	(2.89)	(3.00)	(2.11)	(2.00)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Lasso	Best	LS	LSid	RSW	RSWid	RSWH	RSWHid
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	automobile	18.45(2)	23.65(7)	19.02(3)	19.62(6)	19.62(5)	19.39(4)	<b>16.44</b> (1)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	fertility	92.95(3)	93.13(5)	110.25(7)	92.95(1)	92.95(1)	93.07(4)	96.93(6)
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	flow	66.66(5)	285.32(7)	117.76(6)	65.12(3)	66.16(4)	64.99(2)	<b>57.16</b> (1)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	forest	99.65(6)	99.58(5)	101.48(7)	98.13(2)	98.02(1)	98.27(3)	99.33(4)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	servo	102.02(7)	69.73(6)	65.18(5)	60.84(4)	60.61(3)	59.63(2)	<b>56.87</b> (1)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	slump	86.85(5)	411.18(7)	137.06(6)	85.19(4)	84.63(2)	84.90(3)	79.17(1)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	traffic	40.24(4)	2.06E+09(7)	4.45E+08(6)	35.20(3)	35.15(2)	34.86(1)	43.84(5)
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	wine_red	96.71(5)	134.17(6)	626.27(7)	78.49(4)	75.95(3)	75.67(2)	<b>65.63</b> (1)
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	wine_white	95.58(7)	78.45(3)	72.98(1)	82.90(5)	83.23(6)	81.56(4)	73.74(2)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Avg. Rank	(4.89)	(5.89)	(5.33)	(3.61)	(3.06)	(2.78)	(2.44)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	SVR	Best	LS	LSid	RSW	RSWid	RSWH	RSWHid
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	automobile	114.30(5)	3.68E+14(7)	7.76E+13(6)	76.07(3)	39.50(2)	76.54(4)	<b>16.10</b> (1)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	fertility	184.62(5)	1.03E+03(6)	1.26E+04(7)	95.79(1)	95.79(1)	101.98(4)	101.94(3)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	flow	106.54(5)	1.04E+13(7)	7.76E+12(6)	93.44(4)	66.55(2)	91.07(3)	<b>58.82</b> (1)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	forest	101.04(5)	3.97E+11(7)	2.01E+08(6)	98.38(3)	98.05(1)	98.38(2)	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	servo	117.03(5)	326.15(6)	924.38(7)	26.90(3)	28.44(4)	<b>23.37</b> (1)	24.23(2)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	slump	116.65(5)	4.38E + 14(7)	1.53E+12(6)	97.90(4)	81.68(2)	95.55(3)	<b>78.91</b> (1)
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	traffic					` '	. ,	` '
	wine_red			` '		75.36(5)	71.02(3)	60.34(2)
	wine_white	99.63(7)	73.36(6)	<b>59.24</b> (1)	72.85(4)	73.04(5)	70.17(3)	61.62(2)
	Avg. Rank	(5.44)	(6.33)	(5.11)	(3.50)	(2.94)	(2.78)	(1.89)

Table 4: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), linear regression via least squared with the option of adding instance description (LSid) or not (LS) to the ensemble, non-hyperparametric stacking stepwise regression over residuals adding instance description (RSWid) or not (RSW) to the ensemble and non-hyperparametric stacking stepwise regression over residual with the heuristic to provide zero weights to some models adding instance description to the ensemble (RSWHid) or not (RSWH), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the PSO sampling strategy.