kNNR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	23.85(3)	23.97(4)	**21.33**(1)	25.76(5)	26.00(6)	27.21(7)	23.04(2)
fertility	112.60(5)	**100.38**(1)	117.25(7)	110.46(4)	116.35(6)	106.84(2)	108.23(3)
flow	90.16(5)	98.01(7)	74.38(3)	89.06(4)	67.93(2)	97.01(6)	**61.32**(1)
forest	101.94(7)	**98.68**(1)	101.40(6)	99.82(4)	99.58(3)	99.42(2)	100.65(5)
servo	50.35(7)	43.11(2)	**37.48**(1)	46.21(4)	46.98(5)	44.49(3)	48.55(6)
slump	95.58(4)	105.58(7)	103.49(5)	94.28(3)	91.99(2)	104.05(6)	**89.64**(1)
traffic	35.28(4)	**32.48**(1)	42.40(7)	34.31(2)	34.54(3)	35.98(5)	38.16(6)
wine_red	84.81(7)	79.89(4)	**62.57**(1)	84.52(6)	79.17(3)	80.84(5)	65.19(2)
wine_white	84.91(7)	77.94(3)	**65.13**(1)	84.67(6)	84.11(5)	80.04(4)	65.74(2)
Avg. Rank	(5.44)	(3.33)	(3.56)	(4.22)	(3.89)	(4.44)	(**3.11**)
Ridge	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	19.51(3)	2.72E+12(7)	9.53E+11(6)	19.57(4)	19.62(5)	**18.64**(1)	18.77(2)
fertility	102.34(2)	1.91E+03(6)	7.38E+03(7)	102.95(3)	106.90(4)	**97.05**(1)	106.99(5)
flow	65.66(5)	6.86E+08(7)	2.49E+07(6)	65.25(3)	65.31(4)	64.61(2)	**63.24**(1)
forest	99.01(4)	2.33E+03(7)	766.84(6)	**97.88**(1)	98.14(2)	98.26(3)	99.69(5)
servo	**62.32**(1)	9.30E+06(7)	5.11E+04(6)	62.68(3)	62.38(2)	63.54(5)	63.05(4)
slump	86.55(5)	7.14E+09(7)	2.00E+07(6)	85.69(4)	84.37(2)	85.59(3)	**78.64**(1)
traffic	39.51(4)	4.95E+10(7)	3.04E+09(6)	39.47(3)	39.65(5)	36.84(2)	**36.01**(1)
wine_red	64.91(3)	1.80E+08(7)	1.27E+04(6)	64.91(2)	**64.90**(1)	64.96(4)	64.99(5)
wine_white	72.66(3)	7.49E+05(7)	3.47E+04(6)	72.66(4)	72.65(2)	**72.64**(1)	72.66(5)
Avg. Rank	(3.33)	(6.89)	(6.11)	(3.00)	(3.00)	(**2.44**)	(3.22)
Lasso	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	18.45(4)	35.87(7)	24.49(6)	18.31(3)	18.31(2)	**18.19**(1)	19.45(5)
fertility	**95.85**(1)	206.10(7)	136.56(6)	96.09(2)	99.02(4)	96.66(3)	103.80(5)
flow	66.81(5)	74.92(6)	75.57(7)	66.48(3)	66.50(4)	65.59(2)	**62.85**(1)
forest	100.09(5)	105.79(6)	112.39(7)	98.79(3)	**98.11**(1)	98.34(2)	99.47(4)
servo	63.62(6)	**51.57**(1)	53.28(2)	63.23(3)	63.34(4)	63.77(7)	63.52(5)
slump	87.59(4)	91.71(6)	99.15(7)	86.73(3)	88.06(5)	86.05(2)	**81.32**(1)
traffic	38.64(3)	1.09E+07(6)	3.09E+08(7)	39.13(5)	38.94(4)	**37.39**(1)	37.58(2)
wine_red	69.24(5)	105.45(7)	72.29(6)	69.23(4)	69.00(3)	68.94(2)	**65.74**(1)
wine_white	78.33(6)	78.21(4)	**73.20**(1)	78.33(7)	77.18(3)	78.31(5)	73.63(2)
Avg. Rank	(4.33)	(5.56)	(5.44)	(3.67)	(3.33)	(**2.78**)	(2.89)
SVR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	20.98(5)	1.54E+11(6)	4.06E+11(7)	20.94(4)	20.86(2)	20.94(3)	**20.31**(1)
fertility	97.80(4)	635.89(6)	2.67E+03(7)	96.30(2)	**95.76**(1)	96.80(3)	105.35(5)
flow	72.96(5)	4.38E+09(7)	2.69E+09(6)	68.69(3)	67.77(2)	72.86(4)	**63.65**(1)
forest	**100.85**(1)	2536.09(6)	5.81E+03(7)	103.60(5)	101.86(4)	101.20(3)	101.00(2)
servo	22.64(5)	697.48(6)	8.24E+04(7)	19.14(2)	19.57(3)	**19.13**(1)	20.16(4)
slump	**71.52**(1)	1.14E+12(6)	1.40E+12(7)	83.34(3)	82.85(2)	164.42(5)	89.02(4)
traffic	36.96(3)	1.65E+07(7)	2.96E+06(6)	**36.01**(1)	36.37(2)	38.02(4)	45.25(5)
wine_red	65.92(6)	64.41(3)	85.72(7)	65.83(4)	65.85(5)	57.33(2)	**57.16**(1)
wine_white	72.60(7)	55.12(2)	**54.97**(1)	72.28(5)	72.45(6)	57.68(4)	57.42(3)
Avg. Rank	(4.11)	(5.44)	(6.11)	(3.22)	(3.00)	(3.22)	(**2.89**)

Table 1: 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 features (LRX) or not (LR), non-hyperparametric stepwise regression adding features (SWRX) or not (SWR) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the GS sampling strategy.

kNNR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	24.00(3)	26.18(7)	**22.32**(1)	25.12(4)	25.19(5)	26.03(6)	22.85(2)
fertility	98.29(3)	102.88(4)	117.05(7)	97.87(2)	104.65(6)	**97.70**(1)	104.19(5)
flow	87.64(5)	90.45(6)	64.75(2)	87.28(4)	67.93(3)	94.66(7)	**59.72**(1)
forest	103.34(7)	99.63(3)	101.05(6)	100.69(5)	**98.39**(1)	99.33(2)	99.70(4)
servo	48.98(7)	44.49(4)	**40.00**(1)	45.63(5)	46.86(6)	43.95(2)	44.21(3)
slump	95.02(4)	104.81(7)	98.99(5)	94.74(3)	92.13(2)	100.93(6)	**89.88**(1)
traffic	34.54(5)	**33.30**(1)	41.86(7)	34.30(4)	34.28(3)	34.11(2)	34.97(6)
wine_red	84.85(7)	82.87(4)	**64.18**(1)	84.70(6)	79.17(3)	83.13(5)	66.28(2)
wine_white	86.12(7)	81.34(3)	**66.83**(1)	86.00(6)	85.10(5)	81.62(4)	67.08(2)
Avg. Rank	(5.33)	(4.33)	(3.44)	(4.33)	(3.78)	(3.89)	(**2.89**)
Ridge	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	19.79(3)	88.54(6)	154.36(7)	19.86(4)	19.91(5)	**18.80**(1)	19.40(2)
fertility	102.37(2)	2.46E+13(7)	1.06E+04(6)	102.93(3)	106.90(4)	**97.77**(1)	106.99(5)
flow	65.66(5)	2.00E+08(7)	1.32E+07(6)	65.25(3)	65.31(4)	64.64(2)	**63.24**(1)
forest	99.01(4)	9.54E+10(7)	4.14E+07(6)	**97.88**(1)	98.13(2)	98.26(3)	99.69(5)
servo	**62.34**(1)	4.52E+09(6)	8.55E+09(7)	62.68(3)	62.40(2)	63.39(5)	63.08(4)
slump	86.55(5)	5.19E+08(7)	6.30E+07(6)	85.69(4)	84.37(2)	85.69(3)	**78.64**(1)
traffic	39.81(3)	7.17E+12(7)	1.02E+08(6)	40.19(5)	39.96(4)	37.21(2)	**36.40**(1)
wine_red	64.85(3)	3.17E+04(7)	1.52E+04(6)	64.85(2)	**64.81**(1)	64.89(4)	64.94(5)
wine_white	72.96(2)	1.84E+05(7)	1.60E+05(6)	72.96(3)	72.96(4)	72.96(5)	**72.89**(1)
Avg. Rank	(3.11)	(6.78)	(6.22)	(3.11)	(3.11)	(2.89)	(**2.78**)
Lasso	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	18.55(4)	8.68E+05(7)	1.43E+05(6)	18.40(2)	18.40(3)	**18.29**(1)	19.42(5)
fertility	92.95(1)	93.20(4)	118.85(7)	93.09(3)	97.43(5)	93.04(2)	103.44(6)
flow	65.12(5)	87.70(6)	292.57(7)	64.77(4)	64.62(3)	64.18(2)	**62.61**(1)
forest	99.50(4)	124.95(7)	103.11(6)	**98.06**(1)	98.11(2)	98.25(3)	99.65(5)
servo	64.85(5)	67.55(7)	64.17(4)	63.98(3)	63.87(2)	**63.67**(1)	65.35(6)
slump	85.84(5)	1.44E+04(6)	1.57E+04(7)	85.26(3)	83.99(2)	85.55(4)	**80.71**(1)
traffic	**33.98**(1)	36.27(5)	43.16(6)	34.38(2)	34.53(3)	34.68(4)	49.65(7)
wine_red	74.83(6)	75.33(7)	**65.06**(1)	74.81(5)	74.00(3)	74.53(4)	65.75(2)
wine_white	78.77(6)	78.50(4)	**72.74**(1)	78.77(7)	77.65(3)	78.54(5)	74.22(2)
Avg. Rank	(4.11)	(5.89)	(5.00)	(3.33)	(**2.89**)	(**2.89**)	(3.89)
SVR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	19.78(5)	6.15E+12(6)	9.87E+12(7)	19.59(3)	19.60(4)	19.15(2)	**18.33**(1)
fertility	97.73(4)	689.85(6)	4.76E+03(7)	**95.39**(1)	96.22(2)	96.52(3)	102.74(5)
flow	72.44(5)	4.16E+09(6)	2.45E+17(7)	69.66(2)	71.36(3)	72.02(4)	**63.16**(1)
forest	**98.09**(1)	171.15(6)	781.11(7)	99.11(4)	98.24(2)	98.60(3)	100.18(5)
servo	20.81(5)	3.63E+15(7)	1.83E+15(6)	19.62(4)	18.98(3)	**18.52**(1)	18.75(2)
slump	93.90(5)	3.61E+10(6)	7.97E+16(7)	85.55(3)	83.96(2)	**77.52**(1)	87.43(4)
traffic	48.05(2)	4.62E+04(6)	3.50E+05(7)	48.98(4)	48.36(3)	**43.16**(1)	49.83(5)
wine_red	66.14(6)	65.91(5)	167.07(7)	65.69(3)	65.70(4)	**57.32**(1)	57.74(2)
wine_white	73.11(7)	59.29(3)	63.53(4)	72.88(5)	72.88(5)	57.93(2)	**57.93**(1)
Avg. Rank	(4.44)	(5.67)	(6.56)	(3.28)	(3.17)	(**2.00**)	(2.89)

Table 2: 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 features (LRX) or not (LR), non-hyperparametric stepwise regression adding features (SWRX) or not (SWR) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the RS sampling strategy.

kNNR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	25.92(7)	23.95(2)	**20.09**(1)	25.35(4)	25.57(5)	24.41(3)	25.73(6)
fertility	94.03(3)	**93.25**(1)	105.91(7)	94.04(4)	93.49(2)	96.23(5)	102.26(6)
flow	84.84(5)	91.92(7)	67.85(3)	82.97(4)	67.64(2)	89.79(6)	**59.19**(1)
forest	102.95(7)	99.74(5)	101.76(6)	98.77(3)	**98.40**(1)	98.48(2)	99.47(4)
servo	52.69(7)	44.25(2)	**39.87**(1)	48.38(5)	49.84(6)	45.19(3)	45.36(4)
slump	92.59(5)	99.48(7)	86.98(3)	90.97(4)	**81.00**(1)	93.50(6)	85.03(2)
traffic	33.44(2)	33.89(3)	45.37(7)	33.92(4)	34.03(5)	**32.14**(1)	34.71(6)
wine_red	85.29(7)	79.13(3)	**61.83**(1)	85.04(6)	82.04(5)	80.14(4)	64.04(2)
wine_white	85.24(7)	78.64(3)	**65.55**(1)	85.03(6)	85.01(5)	79.88(4)	65.69(2)
Avg. Rank	(5.56)	(3.67)	(**3.33**)	(4.44)	(3.56)	(3.78)	(3.67)
Ridge	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	18.35(3)	2.85E+04(7)	1.04E+04(6)	18.52(4)	18.72(5)	18.20(2)	**16.23**(1)
fertility	102.35(2)	5.18E+08(7)	3.87E+08(6)	102.46(3)	103.96(4)	**95.11**(1)	103.98(5)
flow	65.31(4)	1.55E+03(7)	78.00(6)	65.22(3)	66.37(5)	64.67(2)	**57.16**(1)
forest	99.34(5)	5.09E+08(7)	1.34E+08(6)	98.15(2)	**98.02**(1)	98.18(3)	99.20(4)
servo	62.42(5)	1.82E+11(6)	2.23E+12(7)	61.46(4)	**60.85**(1)	61.05(2)	61.10(3)
slump	87.34(5)	4.63E+12(7)	7.15E+08(6)	86.67(4)	85.35(2)	85.62(3)	**78.98**(1)
traffic	39.51(5)	2.67E+10(6)	1.68E+11(7)	38.95(3)	39.32(4)	37.97(2)	**37.97**(1)
wine_red	64.85(4)	1.27E+03(7)	1.11E+03(6)	64.81(3)	65.08(5)	64.81(2)	**64.77**(1)
wine_white	72.82(2)	1.58E+03(6)	1.16E+05(7)	72.90(4)	73.00(5)	72.82(3)	**72.75**(1)
Avg. Rank	(3.89)	(6.67)	(6.33)	(3.33)	(3.56)	(2.22)	(**2.00**)
Lasso	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	18.53(3)	19.27(4)	18.27(2)	19.60(7)	19.60(6)	19.37(5)	**16.44**(1)
fertility	92.95(3)	95.16(5)	116.79(7)	**92.95**(1)	92.95(1)	94.34(4)	102.93(6)
flow	64.84(4)	191.60(6)	238.46(7)	64.74(3)	66.02(5)	64.63(2)	**57.34**(1)
forest	99.55(5)	102.38(6)	196.51(7)	98.20(2)	**98.02**(1)	98.31(3)	99.33(4)
servo	62.81(4)	62.43(3)	66.16(6)	61.92(2)	**61.80**(1)	63.72(5)	66.21(7)
slump	85.77(5)	90.98(6)	92.67(7)	85.22(4)	84.61(2)	84.82(3)	**79.15**(1)
traffic	38.22(4)	6.56E+06(6)	2.18E+08(7)	37.83(3)	37.83(2)	**36.09**(1)	38.72(5)
wine_red	66.69(7)	66.50(4)	**64.92**(1)	66.65(6)	66.53(5)	66.49(3)	66.13(2)
wine_white	74.80(5)	74.67(4)	**72.99**(1)	74.92(6)	75.03(7)	74.67(3)	73.08(2)
Avg. Rank	(4.44)	(4.89)	(5.00)	(3.83)	(3.39)	(**3.22**)	(**3.22**)
SVR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	114.69(5)	3.18E+10(6)	1.46E+11(7)	99.46(3)	44.41(2)	99.68(4)	**16.77**(1)
fertility	**92.71**(1)	2.64E+11(7)	1.20E+11(6)	92.95(2)	92.95(2)	103.79(4)	108.64(5)
flow	78.58(3)	4.85E+15(7)	3.01E+11(6)	78.65(4)	80.61(5)	78.27(2)	**59.11**(1)
forest	**97.99**(1)	4.42E+06(6)	7.40E+06(7)	98.25(3)	98.05(2)	98.35(4)	99.70(5)
servo	21.31(4)	4.13E+04(6)	1.05E+15(7)	**20.54**(1)	20.55(2)	20.75(3)	22.48(5)
slump	78.83(4)	1.22E+14(7)	6.48E+13(6)	77.02(2)	82.95(5)	**72.75**(1)	77.71(3)
traffic	**31.31**(1)	398.84(7)	279.16(6)	31.46(2)	31.47(3)	33.54(4)	39.86(5)
wine_red	65.68(5)	92.29(6)	5.16E+13(7)	65.53(4)	65.27(3)	**56.87**(1)	56.88(2)
wine_white	73.27(6)	55.78(2)	**55.37**(1)	73.16(5)	73.32(7)	58.40(3)	58.40(4)
Avg. Rank	(3.33)	(6.00)	(5.89)	(2.94)	(3.50)	(**2.89**)	(3.44)

Table 3: 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 features (LRX) or not (LR), non-hyperparametric stepwise regression adding features (SWRX) or not (SWR) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the BO sampling strategy.

kNNR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	27.27(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)
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	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
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	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
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)	35.20(3)	35.15(2)	**34.86**(1)	43.84(5)
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(3)	**72.98**(1)	82.90(5)	83.23(6)	81.56(4)	73.74(2)
Avg. Rank	(4.89)	(5.89)	(5.33)	(3.61)	(3.06)	(2.78)	(**2.44**)
SVR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	114.30(5)	3.68E+14(7)	7.76E+13(6)	76.07(3)	39.50(2)	76.54(4)	**16.10**(1)
fertility	184.62(5)	1.03E+03(6)	1.26E+04(7)	95.79(1)	**95.79**(1)	101.98(4)	101.94(3)
flow	106.54(5)	1.04E+13(7)	7.76E+12(6)	93.44(4)	66.55(2)	91.07(3)	**58.82**(1)
forest	101.04(5)	3.97E+11(7)	2.01E+08(6)	98.38(3)	**98.05**(1)	98.38(2)	99.69(4)
servo	117.03(5)	326.15(6)	924.38(7)	26.90(3)	28.44(4)	**23.37**(1)	24.23(2)
slump	116.65(5)	4.38E+14(7)	1.53E+12(6)	97.90(4)	81.68(2)	95.55(3)	**78.91**(1)
traffic	89.38(5)	1.02E+04(7)	4.28E+03(6)	55.34(3)	55.82(4)	50.80(2)	**41.93**(1)
wine_red	123.91(7)	71.51(4)	**59.53**(1)	76.59(6)	75.36(5)	71.02(3)	60.34(2)
wine_white	99.63(7)	73.36(6)	**59.24**(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 features (LRX) or not (LR), non-hyperparametric stepwise regression adding features (SWRX) or not (SWR) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the PSO sampling strategy.

kNNR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	26.96(4)	**24.02**(1)	36.73(7)	25.76(2)	26.00(3)	27.26(5)	30.57(6)
fertility	**100.08**(1)	100.23(2)	109.34(6)	110.46(7)	108.76(5)	106.72(4)	104.61(3)
flow	**84.49**(1)	98.01(5)	107.90(7)	89.06(3)	88.33(2)	97.01(4)	102.39(6)
forest	102.02(6)	**98.68**(1)	102.05(7)	99.82(3)	99.96(4)	99.42(2)	101.45(5)
servo	46.06(4)	**44.33**(1)	46.39(5)	46.48(7)	46.42(6)	44.86(2)	45.83(3)
slump	**92.55**(1)	105.58(5)	110.62(7)	94.28(2)	105.71(6)	104.05(4)	100.73(3)
traffic	37.30(4)	36.22(3)	46.04(7)	**35.29**(1)	35.47(2)	37.60(5)	44.99(6)
wine_red	85.30(7)	79.89(3)	**77.78**(1)	84.52(6)	84.51(5)	80.84(4)	79.36(2)
wine_white	84.91(7)	**77.94**(1)	77.96(2)	84.67(5)	84.74(6)	80.04(3)	80.53(4)
Avg. Rank	(3.89)	(**2.44**)	(5.44)	(4.00)	(4.33)	(3.67)	(4.22)
Ridge	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	20.05(4)	3.16E+07(6)	8.84E+07(7)	19.57(3)	19.55(2)	**18.57**(1)	22.09(5)
fertility	102.36(3)	2.05E+03(7)	1.19E+03(6)	102.96(4)	118.86(5)	**97.07**(1)	102.18(2)
flow	66.07(5)	1.30E+07(6)	1.52E+08(7)	65.25(4)	63.56(2)	64.71(3)	**61.61**(1)
forest	99.01(3)	683.72(6)	1.02E+03(7)	**97.88**(1)	99.58(5)	98.25(2)	99.27(4)
servo	**62.34**(1)	201.26(6)	206.49(7)	62.68(2)	62.83(3)	63.52(4)	64.34(5)
slump	86.55(5)	2.97E+08(6)	4.80E+08(7)	85.70(4)	85.41(2)	85.61(3)	**76.88**(1)
traffic	39.51(2)	3.08E+07(6)	3.51E+09(7)	39.53(3)	39.94(4)	**36.86**(1)	47.18(5)
wine_red	**64.89**(1)	1.79E+07(6)	2.05E+07(7)	64.91(2)	65.04(4)	64.96(3)	65.67(5)
wine_white	72.66(5)	6.95E+03(7)	763.03(6)	72.42(3)	72.42(2)	**72.40**(1)	72.47(4)
Avg. Rank	(3.22)	(6.22)	(6.78)	(2.89)	(3.22)	(**2.11**)	(3.56)
Lasso	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	18.45(4)	31.43(6)	58.25(7)	18.31(3)	18.31(2)	**18.19**(1)	20.63(5)
fertility	**95.55**(1)	206.10(6)	270.66(7)	96.09(2)	96.29(3)	96.66(4)	102.64(5)
flow	66.82(5)	199.26(6)	200.90(7)	66.50(4)	64.56(2)	65.61(3)	**61.68**(1)
forest	100.14(5)	105.79(6)	106.76(7)	98.79(2)	99.57(3)	**98.34**(1)	99.61(4)
servo	63.17(3)	51.57(2)	**51.35**(1)	63.23(4)	63.88(6)	63.77(5)	64.69(7)
slump	87.59(5)	96.34(7)	88.76(6)	86.74(4)	86.12(3)	86.06(2)	**77.06**(1)
traffic	38.64(2)	1.09E+07(6)	1.12E+09(7)	39.13(4)	39.03(3)	**37.39**(1)	52.42(5)
wine_red	69.24(4)	105.45(6)	107.94(7)	69.23(3)	69.34(5)	68.94(2)	**68.34**(1)
wine_white	78.40(5)	78.21(2)	78.73(6)	78.33(4)	**78.20**(1)	78.31(3)	78.87(7)
Avg. Rank	(3.78)	(5.22)	(6.11)	(3.33)	(3.11)	(**2.44**)	(4.00)
SVR	Best	LR	LRX	SWR	SWRX	SWRSC	SWRSCX
automobile	**20.60**(1)	273375.72(7)	95129.58(6)	21.48(2)	21.59(3)	21.89(4)	27.68(5)
fertility	98.43(4)	181.23(6)	227.20(7)	**96.19**(1)	96.83(2)	97.97(3)	100.75(5)
flow	70.32(3)	3.69E+06(6)	9.66E+06(7)	65.44(2)	**63.31**(1)	72.94(4)	76.29(5)
forest	**98.14**(1)	122.45(6)	128.73(7)	101.39(3)	101.70(4)	100.46(2)	102.05(5)
servo	21.53(5)	74.73(6)	119.47(7)	20.16(2)	20.42(3)	**19.53**(1)	20.53(4)
slump	80.17(3)	8.55E+14(7)	2.25E+13(6)	**79.01**(1)	79.30(2)	134.35(5)	123.76(4)
traffic	**41.89**(1)	425.97(7)	323.31(6)	48.86(4)	51.73(5)	43.97(2)	45.43(3)
wine_red	66.87(5)	58.91(2)	59.78(4)	68.81(6)	69.00(7)	**58.78**(1)	59.35(3)
wine_white	78.04(5)	289.12(6)	337.95(7)	70.84(4)	70.80(3)	**56.87**(1)	56.91(2)
Avg. Rank	(3.11)	(5.89)	(6.33)	(2.78)	(3.33)	(**2.56**)	(4.00)

Table 5: 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 features (LRX) or not (LR), non-hyperparametric stepwise regression adding features (SWRX) or not (SWR) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the HB sampling strategy.

kNNR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	23.85(5)	**21.95**(1)	21.96(2)	22.02(3)	27.21(6)	23.04(4)	21.28	10.26
fertility	112.60(6)	**96.14**(1)	96.41(2)	98.38(3)	106.84(4)	108.23(5)	93.40	59.15
flow	90.16(4)	87.19(3)	86.81(2)	90.28(5)	97.01(6)	**61.32**(1)	80.93	40.73
forest	101.94(3)	106.33(6)	105.25(5)	104.83(4)	**99.42**(1)	100.65(2)	101.94	90.47
servo	50.35(6)	46.85(3)	46.89(4)	45.14(2)	**44.49**(1)	48.55(5)	42.76	19.39
slump	95.58(4)	91.94(3)	91.88(2)	96.24(5)	104.05(6)	**89.64**(1)	86.73	47.26
traffic	35.28(4)	32.84(2)	**32.77**(1)	33.92(3)	35.98(5)	38.16(6)	31.25	15.21
wine_red	84.81(6)	79.03(2)	79.22(3)	81.97(5)	80.84(4)	**65.19**(1)	84.64	37.56
wine_white	84.91(6)	78.33(2)	78.48(3)	80.27(5)	80.04(4)	**65.74**(1)	83.47	36.56
Avg. Rank	(4.89)	(**2.56**)	(2.67)	(3.89)	(4.11)	(2.89)	-	-
Ridge	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	19.51(6)	**16.92**(1)	16.95(2)	17.20(3)	18.64(4)	18.77(5)	17.03	9.05
fertility	102.34(2)	103.72(5)	103.70(4)	102.50(3)	**97.05**(1)	106.99(6)	102.34	96.86
flow	65.66(3)	66.45(6)	66.45(5)	65.73(4)	64.61(2)	**63.24**(1)	65.30	63.78
forest	99.01(2)	99.46(5)	99.46(4)	99.06(3)	**98.26**(1)	99.69(6)	98.98	97.74
servo	**62.32**(1)	62.51(3)	62.51(4)	62.36(2)	63.54(6)	63.05(5)	61.83	61.36
slump	86.55(3)	87.12(6)	87.11(5)	86.61(4)	85.59(2)	**78.64**(1)	86.18	83.92
traffic	39.51(3)	41.04(6)	40.95(5)	39.90(4)	36.84(2)	**36.01**(1)	39.47	38.01
wine_red	64.91(2)	65.82(6)	65.74(5)	**64.91**(1)	64.96(3)	64.99(4)	64.84	51.31
wine_white	72.66(3)	73.79(6)	73.71(5)	**72.43**(1)	72.64(2)	72.66(4)	72.02	60.11
Avg. Rank	(2.78)	(4.89)	(4.33)	(2.78)	(**2.56**)	(3.67)	-	-
Lasso	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.45(5)	18.45(3)	18.45(2)	18.45(4)	**18.19**(1)	19.45(6)	18.45	18.45
fertility	95.85(4)	**94.17**(1)	94.17(2)	94.83(3)	96.66(5)	103.80(6)	92.74	90.36
flow	66.81(3)	66.82(6)	66.82(5)	66.82(4)	65.59(2)	**62.85**(1)	66.81	66.79
forest	100.09(3)	100.13(6)	100.13(5)	100.12(4)	**98.34**(1)	99.47(2)	100.09	100.08
servo	63.62(5)	**63.38**(1)	63.38(2)	63.43(3)	63.77(6)	63.52(4)	62.67	62.15
slump	87.59(3)	87.61(6)	87.61(5)	87.60(4)	86.05(2)	**81.32**(1)	87.59	87.55
traffic	38.64(3)	39.03(6)	39.02(5)	38.96(4)	**37.39**(1)	37.58(2)	38.60	38.16
wine_red	69.24(3)	70.68(6)	70.67(5)	70.06(4)	68.94(2)	**65.74**(1)	69.24	66.52
wine_white	78.33(3)	78.39(6)	78.39(5)	78.36(4)	78.31(2)	**73.63**(1)	78.33	77.45
Avg. Rank	(3.56)	(4.56)	(4.00)	(3.78)	(**2.44**)	(2.67)	-	-
SVR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	20.98(4)	84.06(6)	45.64(5)	**20.30**(1)	20.94(3)	20.31(2)	19.66	9.78
fertility	97.80(5)	**92.72**(1)	92.98(2)	96.93(4)	96.80(3)	105.35(6)	89.96	49.63
flow	72.96(4)	79.59(5)	83.35(6)	66.26(2)	72.86(3)	**63.65**(1)	59.75	25.32
forest	100.85(4)	**99.22**(1)	99.56(3)	99.38(2)	101.20(6)	101.00(5)	97.20	82.09
servo	22.64(4)	67.92(6)	46.02(5)	22.05(3)	**19.13**(1)	20.16(2)	15.31	10.60
slump	**71.52**(2)	92.52(5)	90.71(4)	71.08(1)	164.42(6)	89.02(3)	71.26	17.17
traffic	36.96(2)	45.02(5)	38.79(4)	**36.33**(1)	38.02(3)	45.25(6)	25.45	6.12
wine_red	65.92(4)	67.67(6)	66.52(5)	59.62(3)	57.33(2)	**57.16**(1)	64.48	13.30
wine_white	72.60(6)	70.13(5)	68.61(4)	61.14(3)	57.68(2)	**57.42**(1)	70.81	12.93
Avg. Rank	(3.89)	(4.44)	(4.22)	(**2.22**)	(3.22)	(3.00)	-	-

Table 6: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), simple average (Basic), the inverse of the error (Inv), Caruana method (Caruana) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the GS sampling strategy. The scores for the cheating approaches WCH and SCH are also shown, but they were not included in the computation of the Friedman ranks.

kNNR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	24.00(5)	23.36(3)	23.28(2)	23.96(4)	26.03(6)	**22.85**(1)	21.17	12.49
fertility	98.29(2)	99.48(5)	99.28(4)	98.42(3)	**97.70**(1)	104.19(6)	96.30	74.70
flow	87.64(5)	85.73(3)	85.73(4)	85.60(2)	94.66(6)	**59.72**(1)	80.43	54.25
forest	103.34(3)	107.01(6)	106.75(5)	104.30(4)	**99.33**(1)	99.70(2)	103.24	93.16
servo	48.98(3)	51.81(5)	51.18(4)	52.48(6)	**43.95**(1)	44.21(2)	41.53	33.22
slump	95.02(5)	91.41(4)	91.33(3)	90.48(2)	100.93(6)	**89.88**(1)	85.60	58.69
traffic	34.54(5)	34.29(4)	34.22(2)	34.24(3)	**34.11**(1)	34.97(6)	32.99	22.68
wine_red	84.85(6)	82.28(2)	82.33(3)	83.20(5)	83.13(4)	**66.28**(1)	84.31	53.25
wine_white	86.12(6)	81.75(3)	81.79(4)	82.51(5)	81.62(2)	**67.08**(1)	83.17	51.17
Avg. Rank	(4.44)	(3.89)	(3.44)	(3.78)	(3.11)	(**2.33**)	-	-
Ridge	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	19.79(6)	17.76(2)	17.79(3)	**17.62**(1)	18.80(4)	19.40(5)	17.78	9.71
fertility	102.37(2)	102.89(5)	102.88(4)	102.40(3)	**97.77**(1)	106.99(6)	102.33	97.20
flow	65.66(3)	66.46(6)	66.46(5)	65.93(4)	64.64(2)	**63.24**(1)	65.30	63.78
forest	99.01(2)	99.45(5)	99.45(4)	99.22(3)	**98.26**(1)	99.69(6)	98.98	97.74
servo	**62.34**(1)	62.43(3)	62.43(4)	62.34(2)	63.39(6)	63.08(5)	61.87	61.44
slump	86.55(3)	86.96(6)	86.96(5)	86.81(4)	85.69(2)	**78.64**(1)	86.18	83.92
traffic	39.81(4)	40.35(6)	40.31(5)	39.73(3)	37.21(2)	**36.40**(1)	39.50	38.17
wine_red	**64.85**(1)	65.81(6)	65.77(5)	64.87(2)	64.89(3)	64.94(4)	64.83	51.75
wine_white	72.96(3)	74.63(6)	74.56(5)	72.95(2)	72.96(4)	**72.89**(1)	72.95	62.54
Avg. Rank	(2.78)	(5.00)	(4.44)	(**2.67**)	(2.78)	(3.33)	-	-
Lasso	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.55(5)	18.50(3)	18.50(2)	18.53(4)	**18.29**(1)	19.42(6)	18.40	18.22
fertility	92.95(3)	**92.92**(1)	92.92(2)	92.95(3)	93.04(5)	103.44(6)	92.80	92.56
flow	65.12(3)	66.00(6)	66.00(5)	65.46(4)	64.18(2)	**62.61**(1)	65.12	63.98
forest	99.50(2)	99.60(4)	99.60(5)	99.55(3)	**98.25**(1)	99.65(6)	99.47	99.03
servo	64.85(2)	74.33(6)	72.62(5)	72.25(4)	**63.67**(1)	65.35(3)	63.28	48.76
slump	85.84(3)	86.57(6)	86.57(5)	86.08(4)	85.55(2)	**80.71**(1)	85.84	83.56
traffic	**33.98**(1)	34.70(4)	34.68(3)	34.83(5)	34.68(2)	49.65(6)	33.92	29.30
wine_red	74.83(3)	84.81(6)	83.94(5)	83.60(4)	74.53(2)	**65.75**(1)	74.83	60.26
wine_white	78.77(3)	85.76(6)	85.24(5)	84.62(4)	78.54(2)	**74.22**(1)	78.77	64.46
Avg. Rank	(2.83)	(4.67)	(4.11)	(3.94)	(**2.00**)	(3.44)	-	-
SVR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	19.78(3)	40.09(6)	23.65(5)	20.43(4)	19.15(2)	**18.33**(1)	19.14	5.42
fertility	97.73(4)	**93.79**(1)	93.88(2)	99.25(5)	96.52(3)	102.74(6)	91.14	57.22
flow	72.44(4)	73.47(6)	70.75(2)	72.71(5)	72.02(3)	**63.16**(1)	61.57	15.26
forest	98.09(2)	99.11(4)	99.42(5)	**98.00**(1)	98.60(3)	100.18(6)	97.05	85.46
servo	20.81(3)	61.09(6)	45.90(5)	23.17(4)	**18.52**(1)	18.75(2)	19.67	10.12
slump	93.90(5)	132.65(6)	91.06(4)	85.82(2)	**77.52**(1)	87.43(3)	85.16	18.96
traffic	48.05(5)	37.85(3)	35.86(2)	**34.84**(1)	43.16(4)	49.83(6)	32.95	9.81
wine_red	66.14(6)	62.47(5)	62.19(4)	60.35(3)	**57.32**(1)	57.74(2)	65.30	17.22
wine_white	73.11(6)	72.57(5)	67.11(4)	62.84(3)	57.93(2)	**57.93**(1)	70.96	10.15
Avg. Rank	(4.22)	(4.67)	(3.67)	(3.11)	(**2.22**)	(3.11)	-	-

Table 7: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), simple average (Basic), the inverse of the error (Inv), Caruana method (Caruana) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the RS sampling strategy. The scores for the cheating approaches WCH and SCH are also shown, but they were not included in the computation of the Friedman ranks.

kNNR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	25.92(6)	24.60(2)	25.40(3)	25.42(4)	**24.41**(1)	25.73(5)	23.20	12.16
fertility	94.03(2)	**93.94**(1)	94.43(4)	94.34(3)	96.23(5)	102.26(6)	92.71	60.65
flow	84.84(4)	83.55(2)	83.68(3)	85.23(5)	89.79(6)	**59.19**(1)	84.55	52.12
forest	102.95(3)	105.98(6)	105.26(5)	104.40(4)	**98.48**(1)	99.47(2)	102.09	90.55
servo	52.69(6)	50.02(3)	50.90(5)	50.38(4)	**45.19**(1)	45.36(2)	50.50	21.41
slump	92.59(5)	87.82(2)	88.34(3)	91.03(4)	93.50(6)	**85.03**(1)	86.94	52.05
traffic	33.44(5)	32.64(3)	32.69(4)	**32.00**(1)	32.14(2)	34.71(6)	31.33	17.12
wine_red	85.29(6)	79.72(2)	80.62(5)	79.94(3)	80.14(4)	**64.04**(1)	84.64	40.13
wine_white	85.24(6)	79.34(3)	80.13(5)	79.20(2)	79.88(4)	**65.69**(1)	84.02	40.09
Avg. Rank	(4.78)	(**2.67**)	(4.11)	(3.33)	(3.33)	(2.78)	-	-
Ridge	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.35(6)	17.39(3)	17.44(4)	16.73(2)	18.20(5)	**16.23**(1)	17.78	10.14
fertility	102.35(2)	102.49(5)	102.49(4)	102.43(3)	**95.11**(1)	103.98(6)	102.31	96.99
flow	65.31(3)	66.19(6)	66.18(5)	65.50(4)	64.67(2)	**57.16**(1)	65.31	64.36
forest	99.34(4)	99.42(6)	99.42(5)	99.33(3)	**98.18**(1)	99.20(2)	99.31	98.51
servo	62.42(5)	62.29(4)	62.29(3)	62.43(6)	**61.05**(1)	61.10(2)	61.87	61.44
slump	87.34(3)	87.48(6)	87.48(5)	87.34(4)	85.62(2)	**78.98**(1)	87.34	86.64
traffic	39.51(3)	40.09(6)	40.06(5)	39.57(4)	37.97(2)	**37.97**(1)	39.47	38.01
wine_red	64.85(3)	64.93(6)	64.93(5)	64.86(4)	64.81(2)	**64.77**(1)	64.83	54.36
wine_white	72.82(2)	72.97(6)	72.96(5)	72.83(4)	72.82(3)	**72.75**(1)	72.82	68.32
Avg. Rank	(3.44)	(5.33)	(4.56)	(3.78)	(2.11)	(**1.78**)	-	-
Lasso	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.53(5)	18.52(2)	18.52(3)	18.53(4)	19.37(6)	**16.44**(1)	18.41	18.29
fertility	**92.95**(1)	93.16(3)	93.10(2)	93.81(4)	94.34(5)	102.93(6)	90.99	82.61
flow	64.84(3)	65.51(6)	65.51(5)	65.03(4)	64.63(2)	**57.34**(1)	64.84	63.43
forest	99.55(3)	99.57(5)	99.57(6)	99.56(4)	**98.31**(1)	99.33(2)	99.53	99.12
servo	**62.81**(1)	67.57(5)	65.30(3)	69.50(6)	63.72(2)	66.21(4)	61.45	43.57
slump	85.77(3)	86.38(6)	86.37(5)	86.28(4)	84.82(2)	**79.15**(1)	85.74	83.13
traffic	38.22(5)	36.43(3)	36.70(4)	36.29(2)	**36.09**(1)	38.72(6)	37.30	30.84
wine_red	66.69(3)	75.31(5)	72.81(4)	76.88(6)	66.49(2)	**66.13**(1)	66.69	51.14
wine_white	74.80(3)	77.74(5)	77.04(4)	78.78(6)	74.67(2)	**73.08**(1)	74.80	60.50
Avg. Rank	(3.00)	(4.44)	(4.00)	(4.44)	(**2.56**)	(**2.56**)	-	-
SVR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	114.69(6)	114.69(3)	114.69(4)	114.69(5)	99.68(2)	**16.77**(1)	114.41	114.27
fertility	92.71(3)	**92.47**(1)	92.58(2)	92.93(4)	103.79(5)	108.64(6)	91.66	76.04
flow	78.58(3)	93.63(6)	92.93(5)	85.87(4)	78.27(2)	**59.11**(1)	71.55	55.09
forest	**97.99**(1)	98.98(5)	98.96(4)	98.24(2)	98.35(3)	99.70(6)	97.81	95.75
servo	21.31(2)	58.40(6)	49.45(5)	26.35(4)	**20.75**(1)	22.48(3)	20.52	13.15
slump	78.83(4)	90.51(6)	89.05(5)	75.38(2)	**72.75**(1)	77.71(3)	77.61	45.24
traffic	**31.31**(1)	41.43(6)	37.58(4)	32.83(2)	33.54(3)	39.86(5)	28.53	9.65
wine_red	65.68(6)	64.46(5)	64.19(4)	60.79(3)	**56.87**(1)	56.88(2)	64.19	19.50
wine_white	73.27(6)	70.70(5)	69.56(4)	61.29(3)	**58.40**(1)	58.40(2)	71.05	17.90
Avg. Rank	(3.56)	(4.78)	(4.11)	(3.22)	(**2.11**)	(3.22)	-	-

Table 8: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), simple average (Basic), the inverse of the error (Inv), Caruana method (Caruana) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the BO sampling strategy. The scores for the cheating approaches WCH and SCH are also shown, but they were not included in the computation of the Friedman ranks.

kNNR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	27.27(6)	21.45(4)	21.30(3)	21.21(2)	23.90(5)	**19.88**(1)	22.74	10.55
fertility	109.07(6)	101.31(4)	100.51(3)	**99.24**(1)	99.78(2)	102.26(5)	96.75	64.73
flow	102.86(6)	84.46(2)	84.47(3)	85.59(4)	87.29(5)	**59.15**(1)	80.75	62.41
forest	141.64(6)	106.44(5)	106.20(4)	104.40(3)	**98.52**(1)	99.68(2)	102.86	93.19
servo	55.11(6)	55.02(5)	54.85(4)	53.48(3)	51.09(2)	**50.50**(1)	45.65	38.28
slump	111.84(6)	89.82(5)	89.62(4)	88.58(3)	86.77(2)	**82.35**(1)	85.79	61.18
traffic	39.66(5)	33.76(4)	33.64(3)	33.31(2)	**32.15**(1)	39.83(6)	31.26	22.37
wine_red	110.39(6)	81.05(2)	81.30(3)	82.56(5)	81.38(4)	**65.27**(1)	84.53	48.46
wine_white	96.76(6)	80.21(4)	80.10(3)	81.00(5)	80.07(2)	**66.40**(1)	83.37	44.14
Avg. Rank	(5.89)	(3.89)	(3.33)	(3.11)	(2.67)	(**2.11**)	-	-
Ridge	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	20.00(6)	17.91(4)	17.84(3)	16.92(2)	18.22(5)	**16.23**(1)	17.86	9.73
fertility	104.17(6)	103.18(4)	103.17(3)	102.67(2)	**95.22**(1)	103.98(5)	102.43	97.38
flow	66.89(6)	66.62(5)	66.61(4)	66.07(3)	65.42(2)	**57.15**(1)	65.71	64.60
forest	99.44(4)	99.57(5)	99.57(6)	99.38(3)	**98.36**(1)	99.20(2)	99.31	98.02
servo	62.27(3)	62.34(5)	62.34(4)	62.44(6)	**61.05**(1)	61.10(2)	61.90	61.50
slump	87.71(6)	87.23(5)	87.23(4)	86.97(3)	85.62(2)	**79.15**(1)	86.28	84.09
traffic	41.28(6)	40.65(5)	40.63(4)	39.81(3)	38.31(2)	**36.18**(1)	39.61	38,42
wine_red	69.12(6)	65.55(5)	65.52(4)	64.87(2)	**64.82**(1)	64.90(3)	64.83	54.53
wine_white	78.12(6)	73.82(5)	73.77(4)	72.98(3)	72.93(2)	**72.83**(1)	72.92	62.92
Avg. Rank	(5.44)	(4.78)	(4.00)	(3.00)	(**1.89**)	(**1.89**)	-	-
Lasso	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.45(2)	18.49(3)	18.49(4)	18.54(5)	19.39(6)	**16.44**(1)	18.40	18.24
fertility	92.95(3)	**92.77**(1)	92.78(2)	92.95(3)	93.07(5)	96.93(6)	92.48	90.07
flow	66.66(6)	65.99(5)	65.99(4)	65.66(3)	64.99(2)	**57.16**(1)	65.21	64.12
forest	99.65(6)	99.58(4)	99.58(5)	99.54(3)	**98.27**(1)	99.33(2)	99.45	99.09
servo	102.02(6)	75.89(5)	73.02(4)	64.29(3)	59.63(2)	**56.87**(1)	60.14	52.34
slump	86.85(6)	86.43(5)	86.43(4)	86.02(3)	84.90(2)	**79.17**(1)	85.75	83.52
traffic	40.24(5)	36.86(4)	36.80(3)	35.72(2)	**34.86**(1)	43.84(6)	35.05	31.64
wine_red	96.71(6)	89.09(5)	88.21(4)	83.54(3)	75.67(2)	**65.63**(1)	78.50	68.64
wine_white	95.58(6)	88.34(5)	87.83(4)	84.48(3)	81.56(2)	**73.74**(1)	82.62	72.14
Avg. Rank	(5.17)	(4.11)	(3.78)	(3.17)	(2.56)	(**2.22**)	-	-
SVR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	114.30(6)	112.36(5)	107.23(4)	91.12(3)	76.54(2)	**16.10**(1)	83.74	82.48
fertility	184.62(6)	110.73(5)	104.17(4)	**94.79**(1)	101.98(3)	101.94(2)	88.94	52.49
flow	106.54(6)	103.90(5)	103.80(4)	97.96(3)	91.07(2)	**58.82**(1)	92.25	75.72
forest	101.04(6)	99.98(5)	99.95(4)	**98.07**(1)	98.38(2)	99.69(3)	97.60	95.49
servo	117.03(6)	72.74(5)	57.21(4)	25.58(3)	**23.37**(1)	24.23(2)	21.51	16.47
slump	116.65(6)	110.74(5)	110.34(4)	100.51(3)	95.55(2)	**78.91**(1)	98.18	75.27
traffic	89.38(6)	70.80(5)	66.98(4)	51.34(3)	50.80(2)	**41.93**(1)	47.88	24.81
wine_red	123.91(6)	81.37(5)	79.89(4)	71.25(3)	71.02(2)	**60.34**(1)	73.97	32,04
wine_white	99.63(6)	75.29(5)	74.84(4)	69.32(2)	70.17(3)	**61.62**(1)	71,50	38.45
Avg. Rank	(6.00)	(5.00)	(4.00)	(2.44)	(2.11)	(**1.44**)	-	-

Table 9: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), simple average (Basic), the inverse of the error (Inv), Caruana method (Caruana) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the PSO sampling strategy. The scores for the cheating approaches WCH and SCH are also shown, but they were not included in the computation of the Friedman ranks.

kNNR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	26.96(4)	**21.95**(1)	21.95(2)	22.02(3)	27.26(5)	30.57(6)	21.27	10.26
fertility	100.08(4)	**95.87**(1)	96.15(2)	97.99(3)	106.72(6)	104.61(5)	93.40	59.15
flow	**84.49**(1)	87.19(3)	86.81(2)	90.28(4)	97.01(5)	102.39(6)	80.93	40.73
forest	102.02(3)	106.33(6)	105.25(5)	104.83(4)	**99.42**(1)	101.45(2)	101.94	90.47
servo	46.06(4)	48.89(6)	47.91(5)	**44.83**(1)	44.86(2)	45.83(3)	44.53	19.87
slump	92.55(3)	91.94(2)	**91.88**(1)	96.24(4)	104.05(6)	100.73(5)	86.73	47.26
traffic	37.30(4)	36.71(3)	**35.91**(1)	35.99(2)	37.60(5)	44.99(6)	31.87	19.84
wine_red	85.30(6)	**79.03**(1)	79.22(2)	81.97(5)	80.84(4)	79.36(3)	84.64	37.56
wine_white	84.91(6)	**78.33**(1)	78.48(2)	80.27(4)	80.04(3)	80.53(5)	83.47	36.56
Avg. Rank	(3.89)	(2.67)	(**2.44**)	(3.33)	(4.11)	(4.56)	-	-
Ridge	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	20.05(5)	**17.20**(1)	17.34(3)	17.21(2)	18.57(4)	22.09(6)	17.03	9.06
fertility	102.36(4)	103.68(6)	103.65(5)	102.35(3)	**97.07**(1)	102.18(2)	102.36	96.91
flow	66.07(4)	66.27(6)	66.27(5)	65.66(3)	64.71(2)	**61.61**(1)	65.30	63.78
forest	99.01(3)	99.34(6)	99.34(5)	99.01(2)	**98.25**(1)	99.27(4)	98.98	97.74
servo	62.34(2)	62.50(3)	62.50(4)	**62.33**(1)	63.52(5)	64.34(6)	61.83	61.37
slump	86.55(3)	86.95(6)	86.95(5)	86.55(4)	85.61(2)	**76.88**(1)	86.18	83.92
traffic	39.51(2)	41.02(5)	40.93(4)	39.56(3)	**36.86**(1)	47.18(6)	39.48	38.07
wine_red	**64.89**(1)	65.43(5)	65.38(4)	64.91(2)	64.96(3)	65.67(6)	64.84	51.36
wine_white	72.66(4)	73.33(6)	73.27(5)	72.50(3)	**72.40**(1)	72.47(2)	72.02	60.33
Avg. Rank	(3.11)	(4.89)	(4.44)	(2.56)	(**2.22**)	(3.78)	-	-
Lasso	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	18.45(5)	18.45(3)	18.45(2)	18.45(4)	**18.19**(1)	20.63(6)	18.45	18.45
fertility	95.55(4)	**94.17**(1)	94.17(2)	94.83(3)	96.66(5)	102.64(6)	92.74	90.36
flow	66.82(3)	66.83(6)	66.83(5)	66.83(4)	65.61(2)	**61.68**(1)	66.82	66.80
forest	100.14(6)	100.13(5)	100.13(4)	100.12(3)	**98.34**(1)	99.61(2)	100.09	100.08
servo	**63.17**(1)	63.38(2)	63.38(3)	63.43(4)	63.77(5)	64.69(6)	62.67	62.15
slump	87.59(3)	87.61(6)	87.61(5)	87.61(4)	86.06(2)	**77.06**(1)	87.59	87.55
traffic	38.64(2)	39.03(5)	39.02(4)	38.96(3)	**37.39**(1)	52.42(6)	38.60	38.16
wine_red	69.24(3)	70.68(6)	70.67(5)	70.06(4)	68.94(2)	**68.34**(1)	69.24	66.52
wine_white	78.40(5)	78.39(4)	78.39(3)	78.36(2)	**78.31**(1)	78.87(6)	78.33	77.45
Avg. Rank	(3.56)	(4.22)	(3.67)	(3.44)	(**2.22**)	(3.89)	-	-
SVR	Best	Basic	Inv	Caruana	SWRSC	SWRSCX	WCH	SCH
automobile	**20.60**(1)	44.64(6)	24.07(4)	20.98(2)	21.89(3)	27.68(5)	19.23	6.98
fertility	98.43(5)	**93.77**(1)	94.18(2)	97.03(3)	97.97(4)	100.75(6)	91.64	54.86
flow	70.32(2)	78.59(6)	71.31(3)	**66.97**(1)	72.94(4)	76.29(5)	59.75	27.47
forest	**98.14**(1)	104.44(6)	99.62(2)	99.67(3)	100.46(4)	102.05(5)	97.64	84.64
servo	21.53(4)	59.23(6)	39.39(5)	**19.25**(1)	19.53(2)	20.53(3)	15.31	11.08
slump	80.17(2)	165.58(6)	85.19(3)	**68.72**(1)	134.35(5)	123.76(4)	71.82	20.48
traffic	41.89(4)	37.77(2)	**35.93**(1)	38.17(3)	43.97(5)	45.43(6)	29.04	8.47
wine_red	66.87(5)	78.14(6)	65.82(4)	60.32(3)	**58.78**(1)	59.35(2)	64.46	9.22
wine_white	78.04(4)	192.42(6)	122.08(5)	61.97(3)	**56.87**(1)	56.91(2)	72.55	11.26
Avg. Rank	(3.11)	(5.00)	(3.22)	(**2.22**)	(3.22)	(4.22)	-	-

Table 10: The 3-fold cross validation relative mean squared error and Friedman ranks for all datasets when the best hyperparameter configuration trial (Best), simple average (Basic), the inverse of the error (Inv), Caruana method (Caruana) and non-hyperparametric stepwise regression adaptation with stop criterion adding features (SWRSCX) or not (SWRSC), all taking into account several baseline systems (kNNR, Ridge, Lasso and SVR) and the HB sampling strategy. The scores for the cheating approaches WCH and SCH are also shown, but they were not included in the computation of the Friedman ranks.