Wages of Wins

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Motivation

- Previous work : predicting match outcomes
- Decent accuracies but what for ?
- MLSA '13 recommendation : beat the bookie !
- Could one actually make money ?

Setting

- Predictions : NCAAB « march madness », NBA, NFL – all 2015/2016
  - Outcomes, not scores **Haven't managed yet to train good score predictors**
  - Basketball as in earlier work, Football described later
- Data: www.kenpom.com, www.basketball-reference.com, www.pro-football-reference.com
- Money Lines : www.vegasinsider.com

Money Lines

- Goal for sports book : make money !
  - Partition betting volume s.t. bettors' wins (+profit) covered by losses
  - Adjust « money lines »

Money Lines (2)

	Match-Up	Favorite	Underdog	Fav-Line	DogLine
1	Detroit at Atlanta	Atlanta	Detroit	300	240
2	Utah at Detroit	Detroit	Utah	110	-110

- Match 1 :
  - Correct bet Detroit, 100$ bet = 240$ gain
  - Correct bet Atlanta, 300$ needed to win 100$ → 100$ bet = 33.33$ gain
- Match 2 : « Pick 'em »
  - Correct bet of 100$ = 90.90$ gain
- Initially based on model, bettor behavior shifts lines

Atlanta clear favorite : motivate people to bet on Detroit

Remember : wins + PROFIT

Correct Dog-Bet > Correct Pick 'em-Bet > Correct Fav-Bet

Simulated betting

- Bet all matches
  - 100$ per match
  - Separate regular/post-season for NBA/NFL
- At money-line w/smallest spread
  - E.g. 170/150 instead of 200/170

Conservative but NOT as conservative as I thought !

- Tally winnings per day
  - And over full period

« Vegas accuracy »

- « Predicts » only favorites
- Pick 'ems → Coin flips → 50 % correct expected
  - Best case all correct
  - Worst case all wrong

Can make big difference financially

NCAAB (67 matches)

5 Pick 'ems

Vegas

w/o Pick 'ems		w/ Pick 'ems					
Accuracy	Pay-out	Exp. Acc	Pay-out	Best Acc.	Pay-out	Worst	Pay-out
0.7419	30.26	0.7313	7.51	0.7611	484.76	0.6865	-469.73

46 Favs

Predictors

Classifier	Naïve Bayes	Multilayer Perceptron	Simplified KenPom
Accuracy	0.6865	0.6417	0.7014
Pay-out	293.52	-605.92	-231.34

Distribution of predictions

Classifier	Favs	Dogs	PEs
NB	39	5	2
MLP	38	2	3
KP	43	0	4

NBA (1288, 115 PEs)

Vegas

w/o Pick 'ems		w/ Pick 'ems					
Accuracy	Pay-out	Exp. Acc	Pay-out	Best Acc.	Pay-out	Worst.	Pay-out
0.7121	-2374.16	0.6865	-1857.3	0.7375	9125.84	0.6492	-12828.81

835 Favs

Predictors

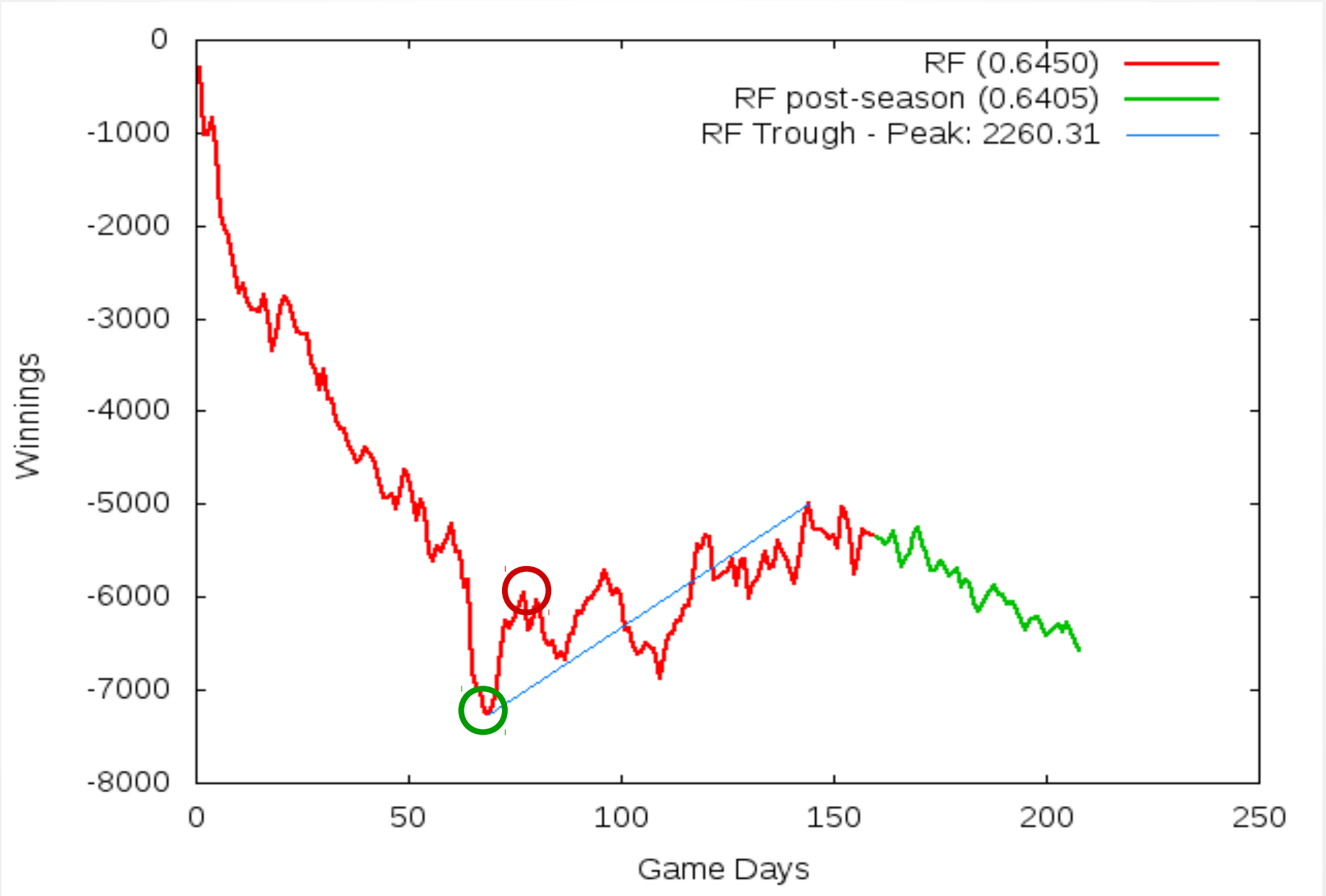
Classifier	NB	MLP	Random Forest	KP
Accuracy	0.6607	0.6615	0.6405	0.6669
Pay-out	-2882.21	-2005.56	-6580.88	-1543.05

Distribution of predictions

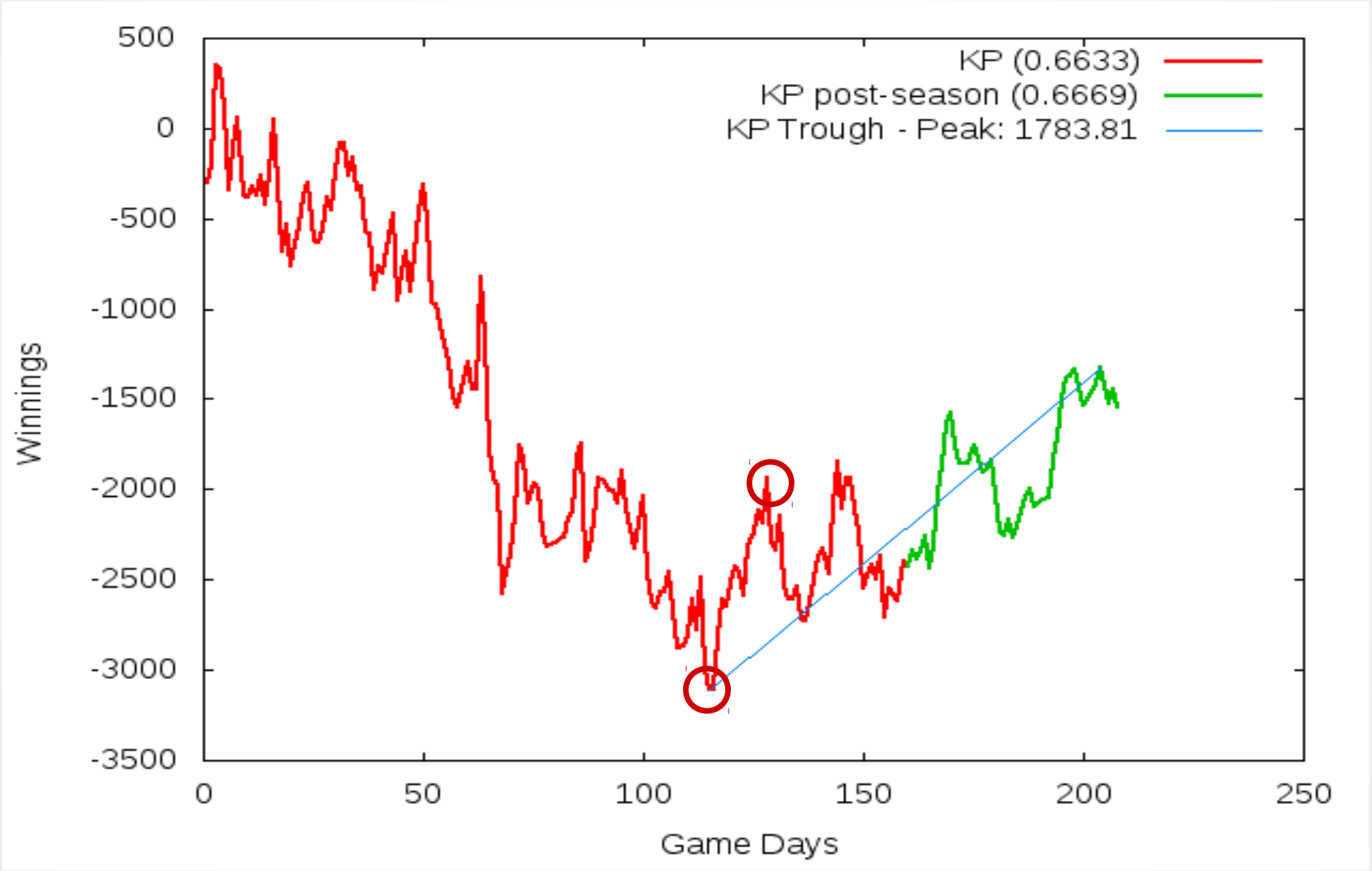
Regular + post-season

Classifier	Favs	Dogs	PEs
NB	740	62	49
MLP	764	66	22
RF	732	65	28
KP	783	64	12

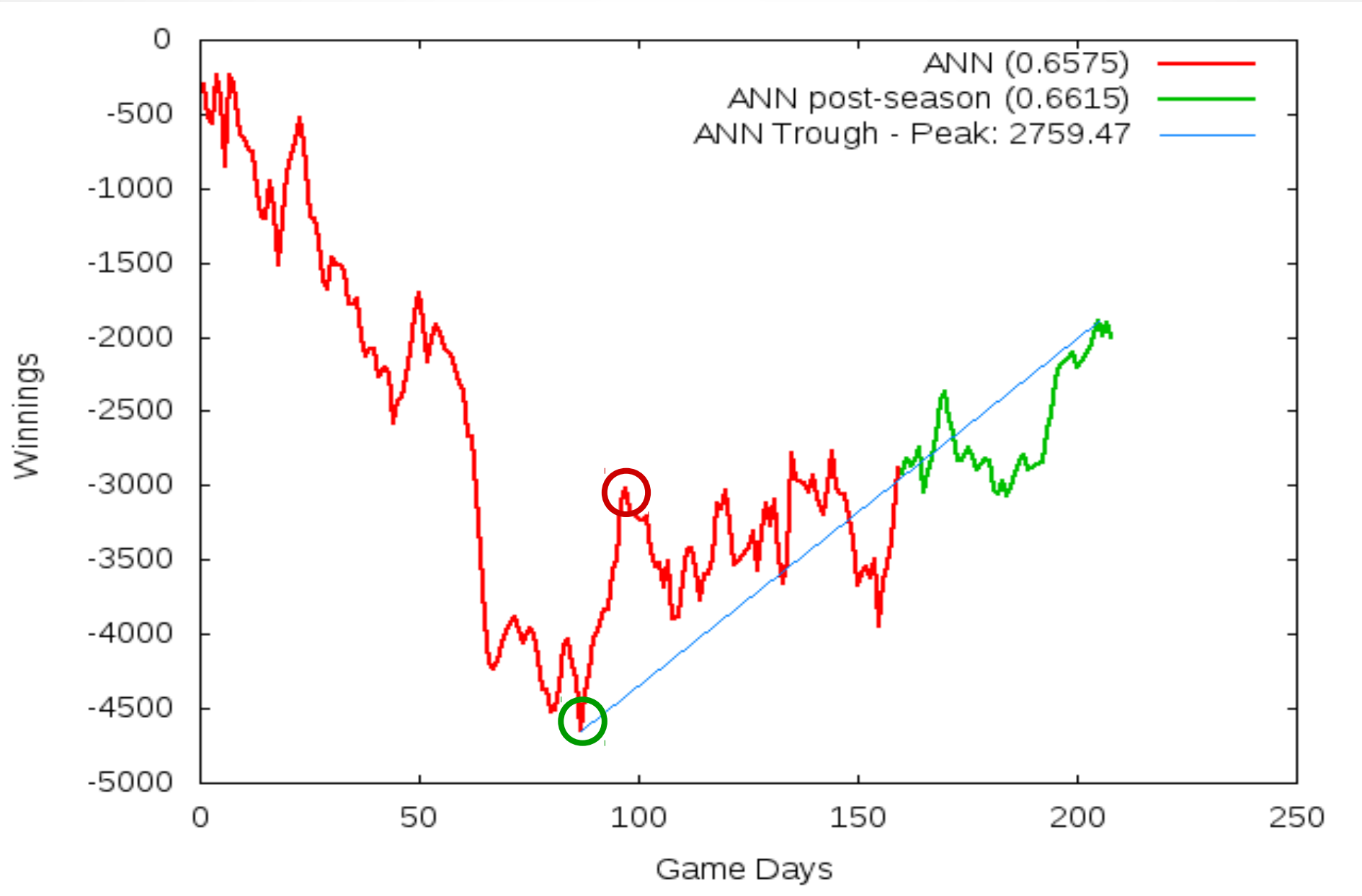
RF winnings curve



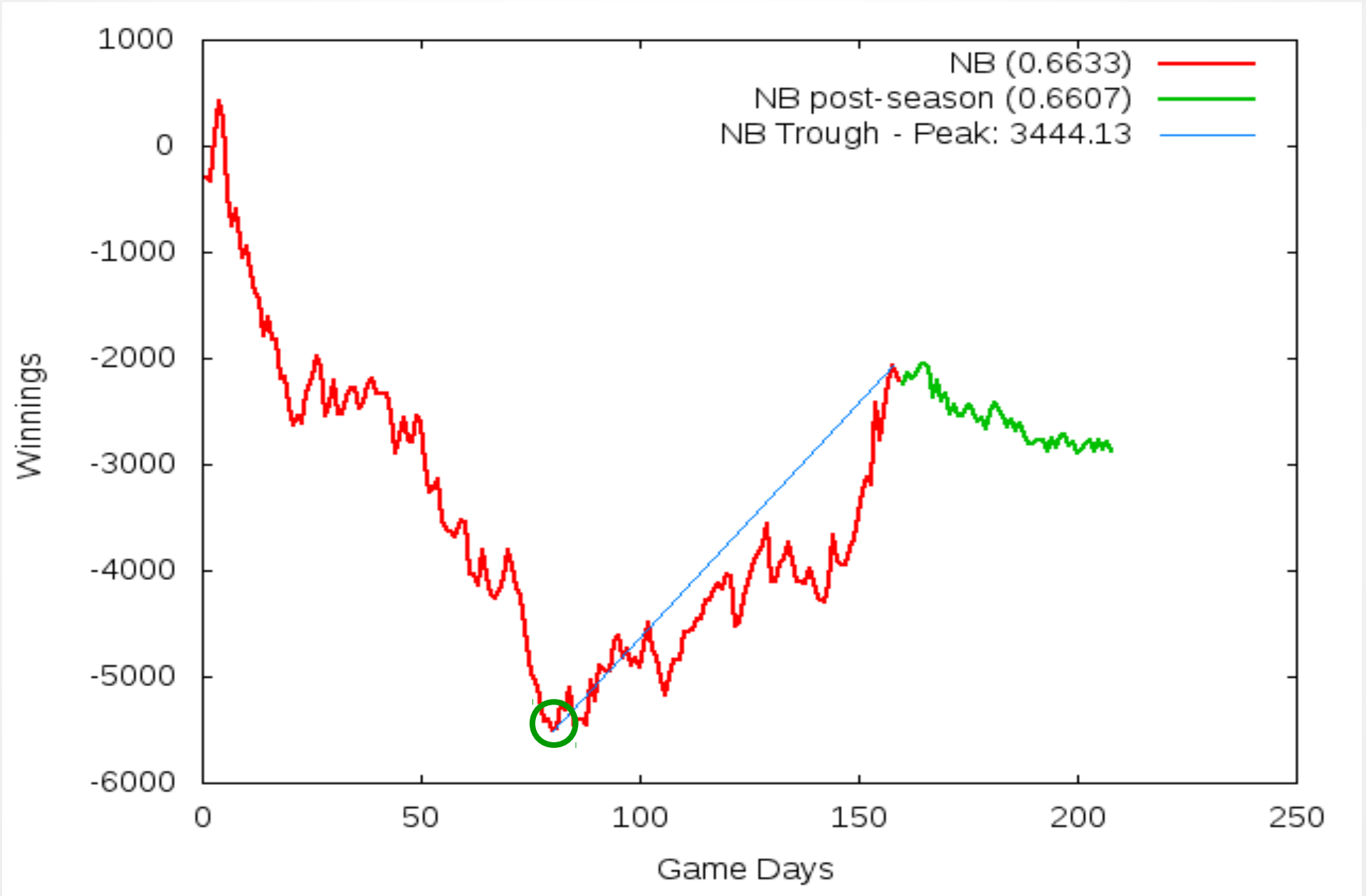
KP winning curve



MLP winning curve



NB winning curve



NFL prediction

- Different game :
  - Different outcomes for possessions
  - Not many scoring events
  - Two (three) distinct sub-teams
  - Fewer matches
- State of the art : « Defense-adjusted Yards above Replacement » (DYAR)
  - Needs fine-grained data, expensive calculation
- My « solutions » :
  - Averaged (adjusted) statistics
  - Opponents' statistics
  - Strength of schedule

NFL (251, 29 PEs)

Vegas

w/o Pick 'ems		w/ Pick 'ems					
Accuracy	Pay-out	Exp. Acc	Pay-out	Best Acc.	Pay-out	Worst	Pay-out
0.6441	-1215.69	0.6294	-1251.92	0.6852	1420.68	0.5697	-4115.42

143 Favs

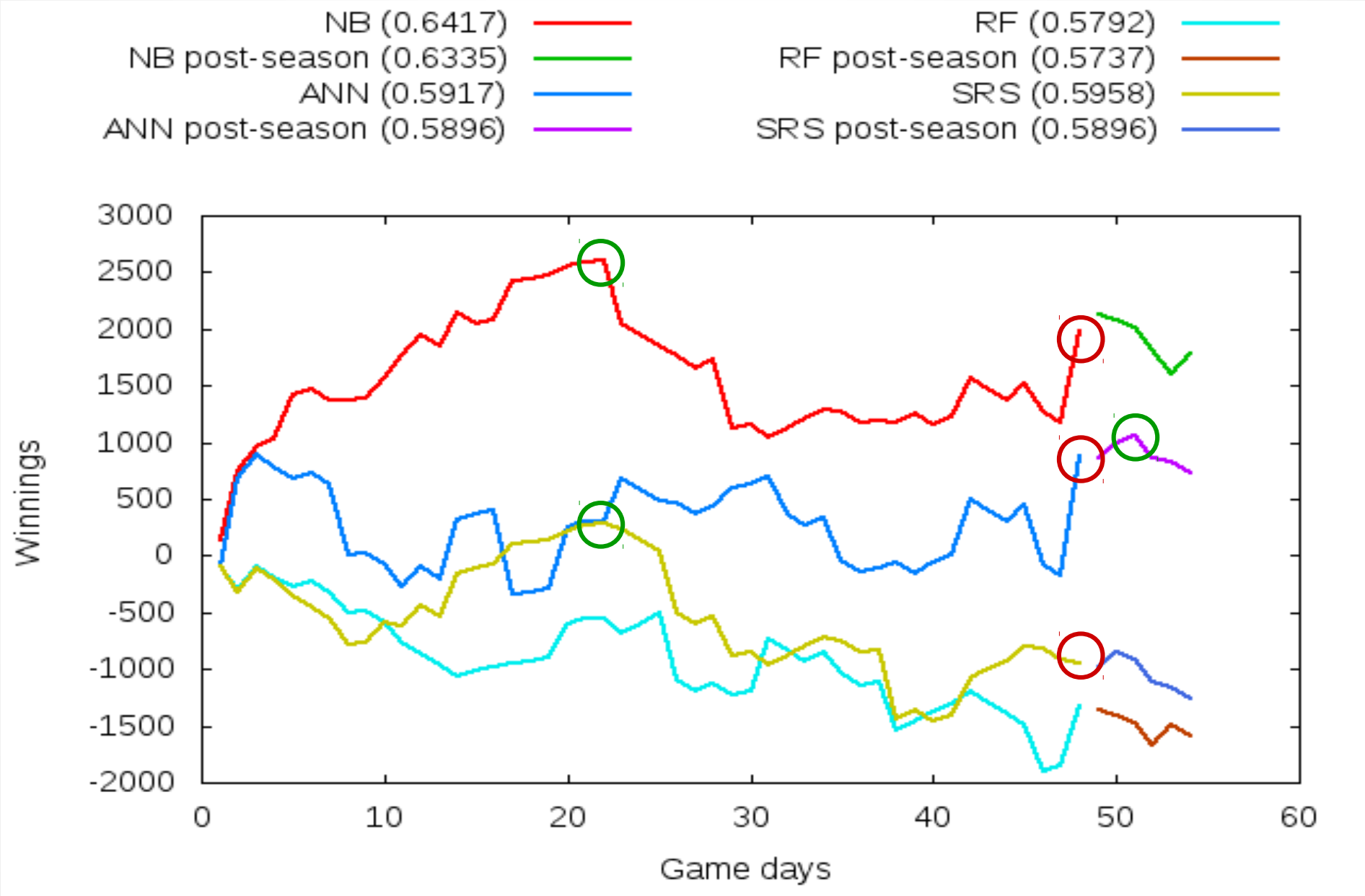
Predictors

Classifier	NB	MLP	RF	Simple Rating System
Accuracy	0.6335	0.5896	0.5737	0.5896
Pay-out	1777.98	729.92	-1591.68	-1255.71

Distribution of predictions

Classifier	Favs	Dogs	PEs
NB	119	26	14
MLP	103	29	16
RF	111	17	16
SRS	115	18	15

NFL winning curves



Can an amateur make money ?

- « Jein »
- NCAAB : possible but few matches/upsets → risky
- NBA : know when to get in
- NFL : know when to get out

Use Naïve Bayes !

Future work

- Characterize distribution by confidence

Not all Favs/Dogs are equal !

- Optimize gains instead of accuracy
  - How **much** to bet
- Learn strategies for **which** matches to bet on

Exists for soccer

I assume no liability for betting losses !

Work-in-progress, unpublished things (like NFL methodology) :

http://scientificdm.wordpress.com