Predicting NCAAB match outcomes

(a numbers talk)

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Who wins a b-ball game?

The team that scores more points!

How do you score points?

You put the ball into the basket!

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- Shots: 2 pointers, 3 pointers, free throws

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- Get/keep the ball: steals, rebounds

How do you score points?

You put the ball into the basket!

- Shots: 2 pointers, 3 pointers, free throws
- Get/keep the ball: steals, rebounds
- Don’t lose the ball: turnovers, fouls

Normalization (1)

10/50 possible rebounds - not that great

10/30 possible rebounds - much better

Oliver 2004

Four Factors

1. Effective field goal percentage
2. Offensive rebound rate
3. Turnover rate
4. Free throw rate

Normalization (2)

Take pace into account: slower games ⇒ **fewer** points

Efficiencies:

- Count possessions, divide by possessions, multiply by 100

Normalization (3)

Take opponent into account: many points against weak defensive team ⇒ **not** impressive

Adjusted efficiencies:

- Divide by opponent's counter stat, multiply by overall average

Pomeroy

Non-ML predictions

Average over season so far

Pythagorean expectation:

$$WinProbability = \frac{((Adjusted)OE_{avg})^y}{((Adjusted)OE_{avg})^y + ((Adjusted)DE_{avg})^y}$$

Naive Zimmermann assumption

Naive Zimmermann assumption

Using Machine Learning instead of statistical methods will lead to better results.

Setting

NCAAB match data

- Location, normalized attributes, win/loss

Season	2009	2010	2011	2012	2013
Train	5265	10601	15990	21373	26772
Test	5336	5389	5383	5399	5464

Prequential error

Season	J48	RF	NB	MLP
2009	68.4%	68.8%	71.1%	70.8%
2010	68.9%	69.4%	71.7%	72.5%
2011	69.1%	67.8%	70.3%	71.6%
2012	70.4%	71.4%	72.8%	74.5%
2013	68.9%	68.8%	71.9%	72.2%

Overfitting: default parameters at fault

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More training data not better

Naive assumption doesn't hold!

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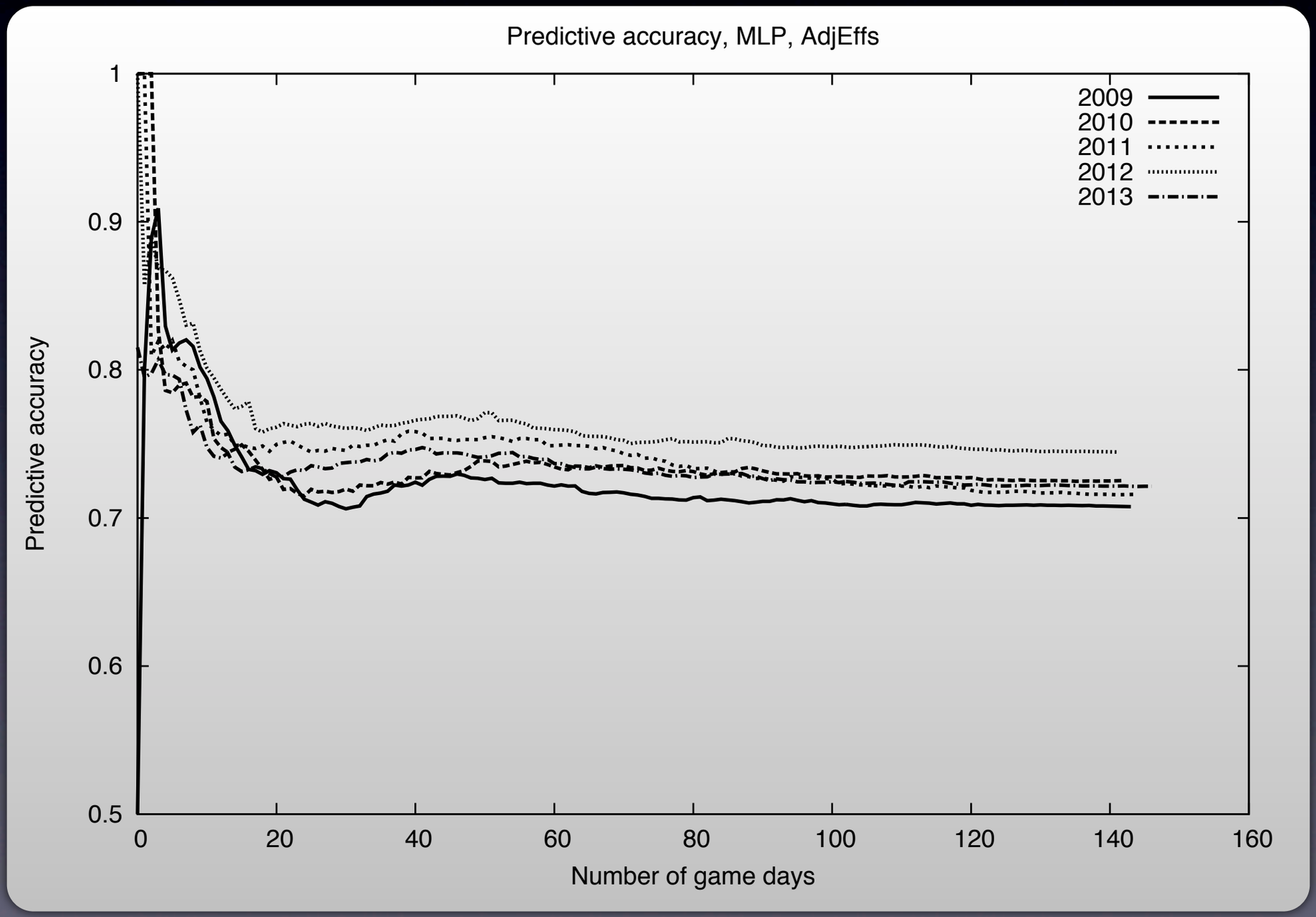
Lesson 1: it's in the attributes

Adjusted Efficiencies, MLP



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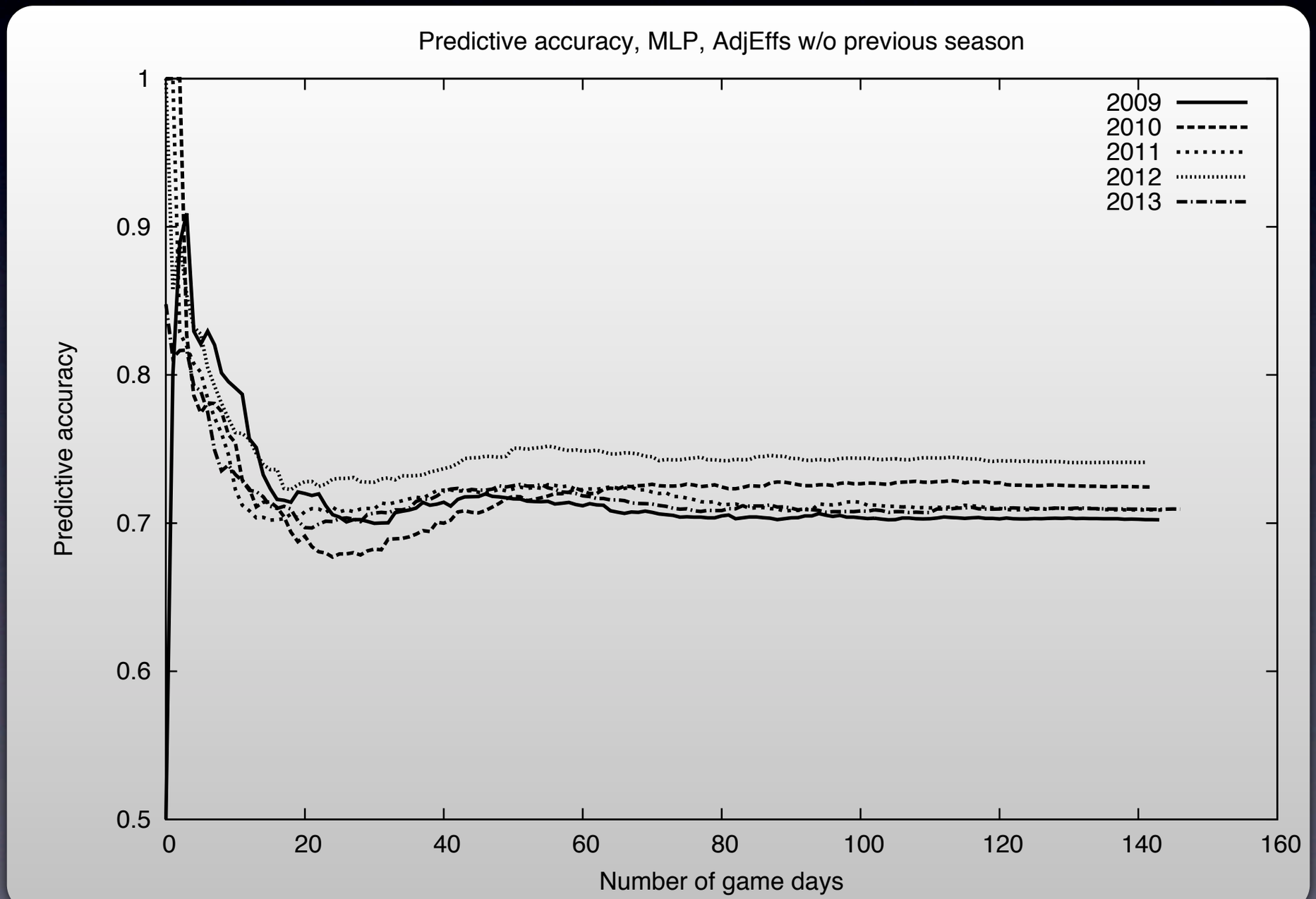
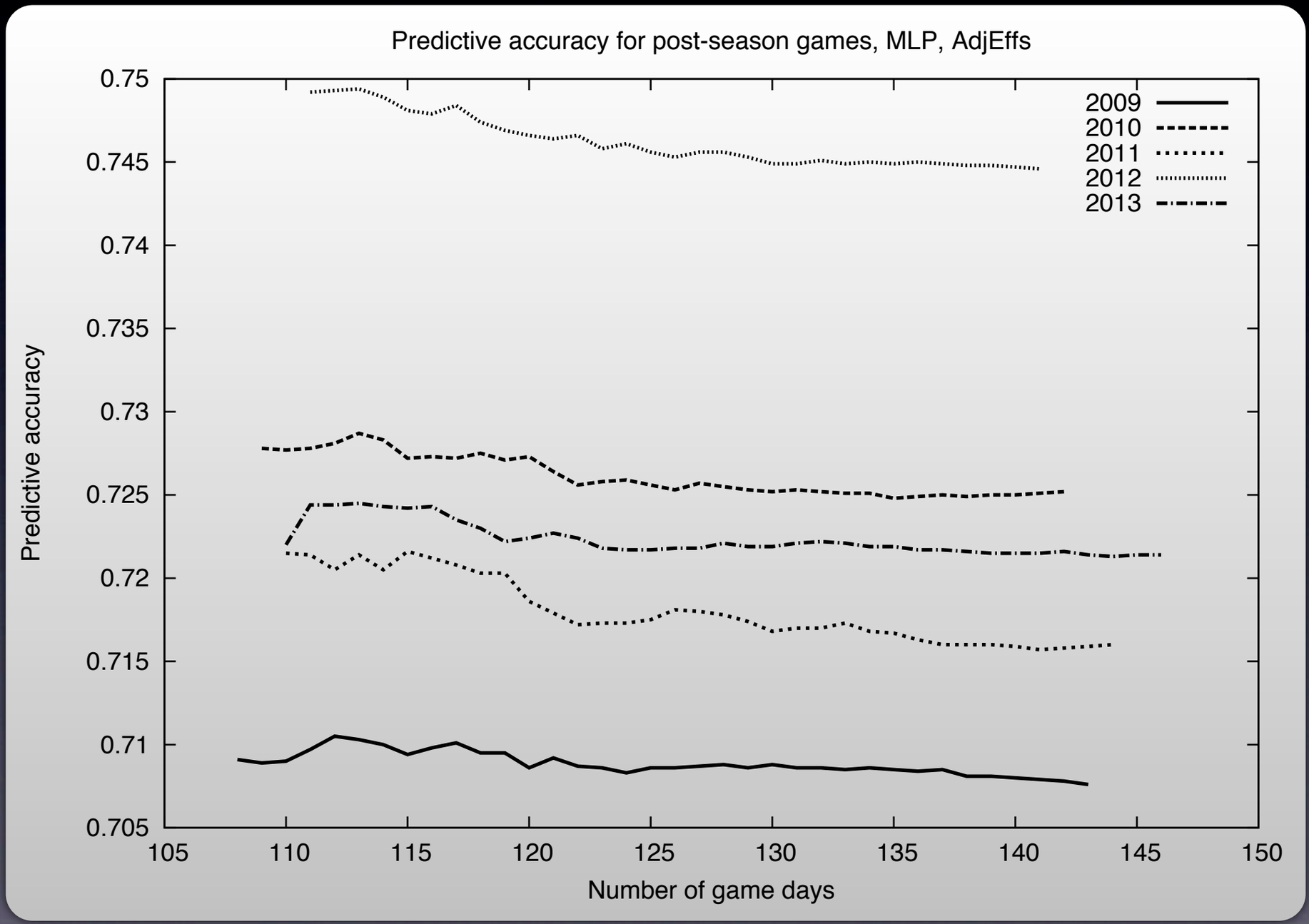


AdjEff, MLP, Post-season



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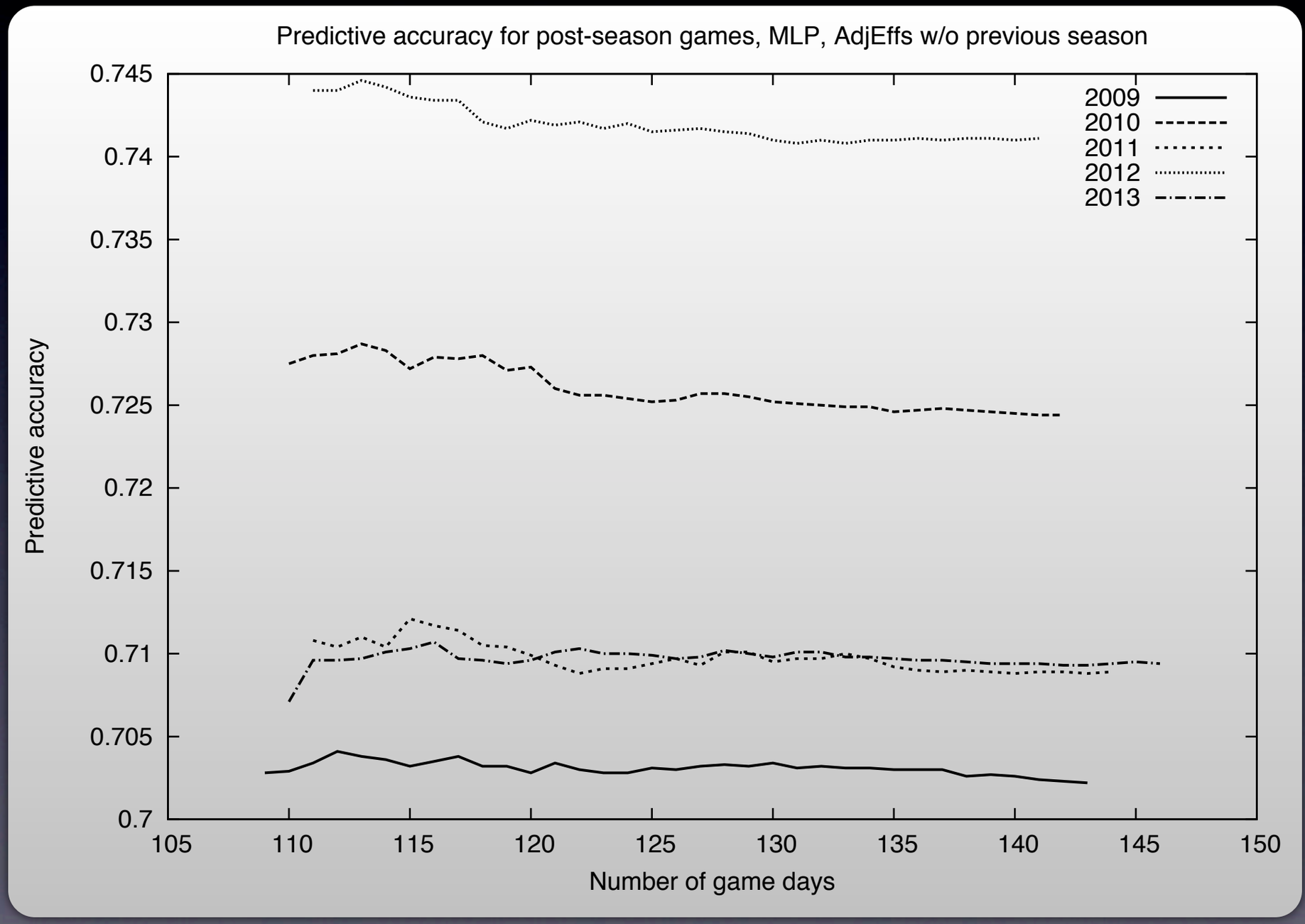
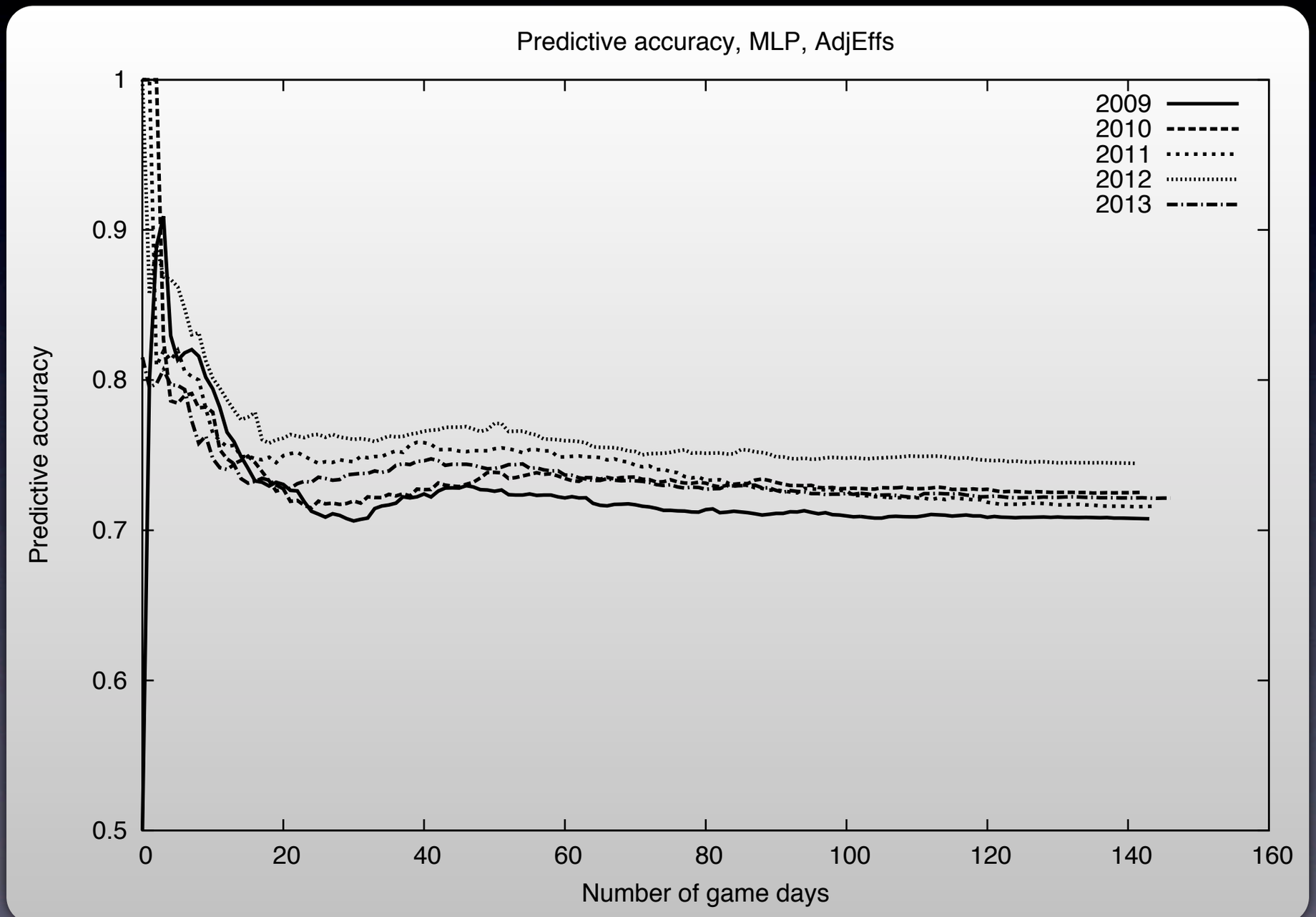


Contribution :)

AdjFF, MLP



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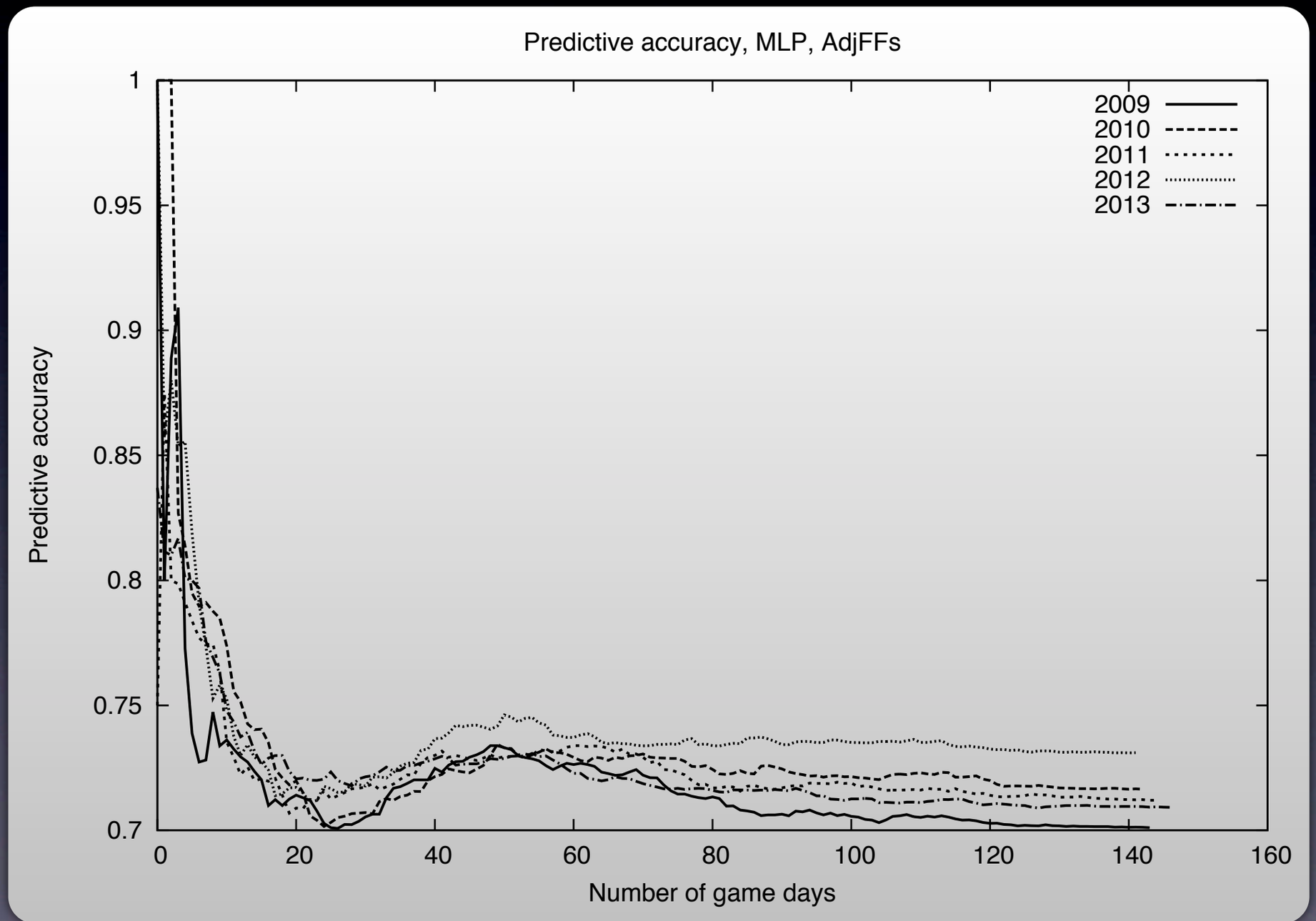

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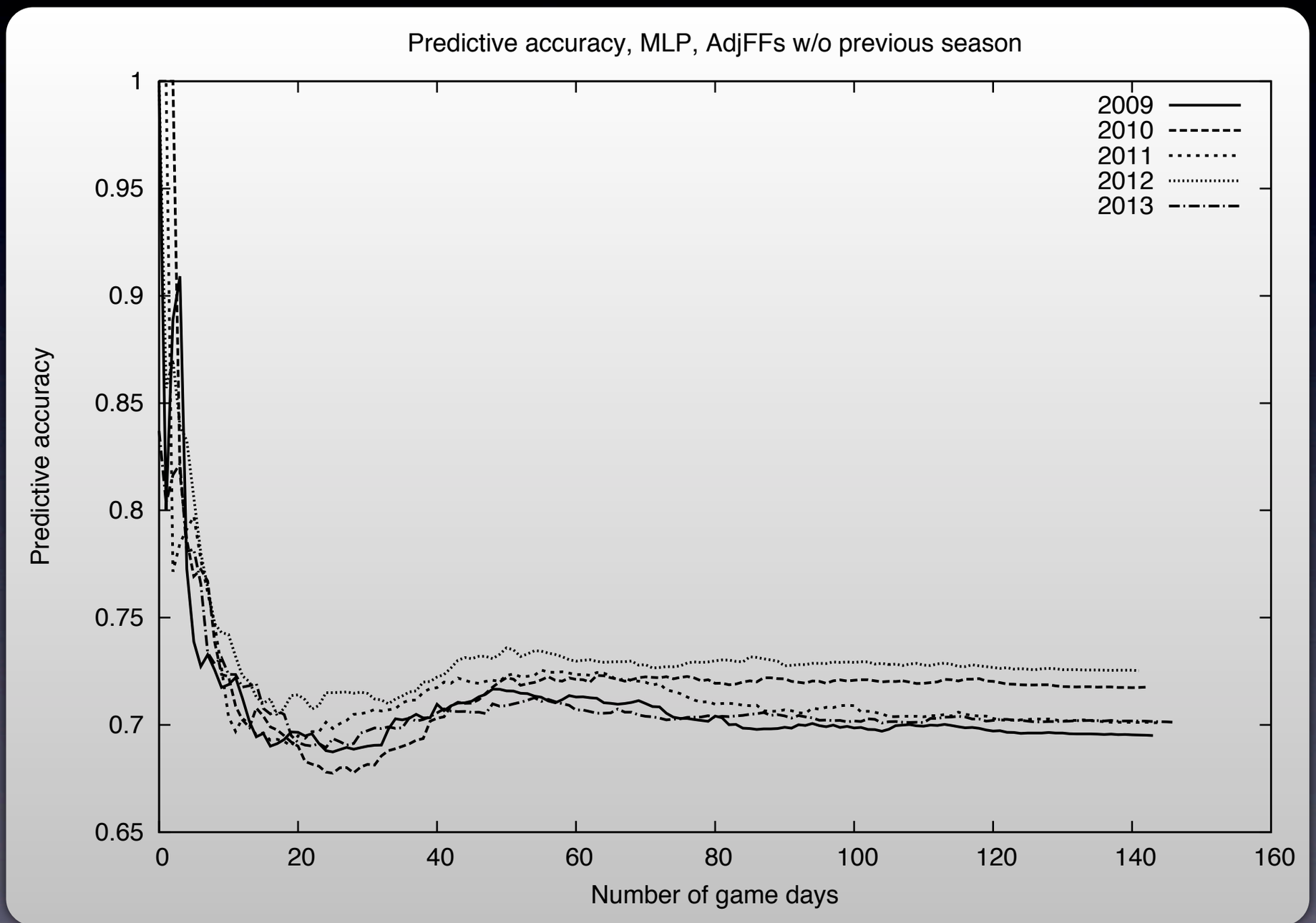

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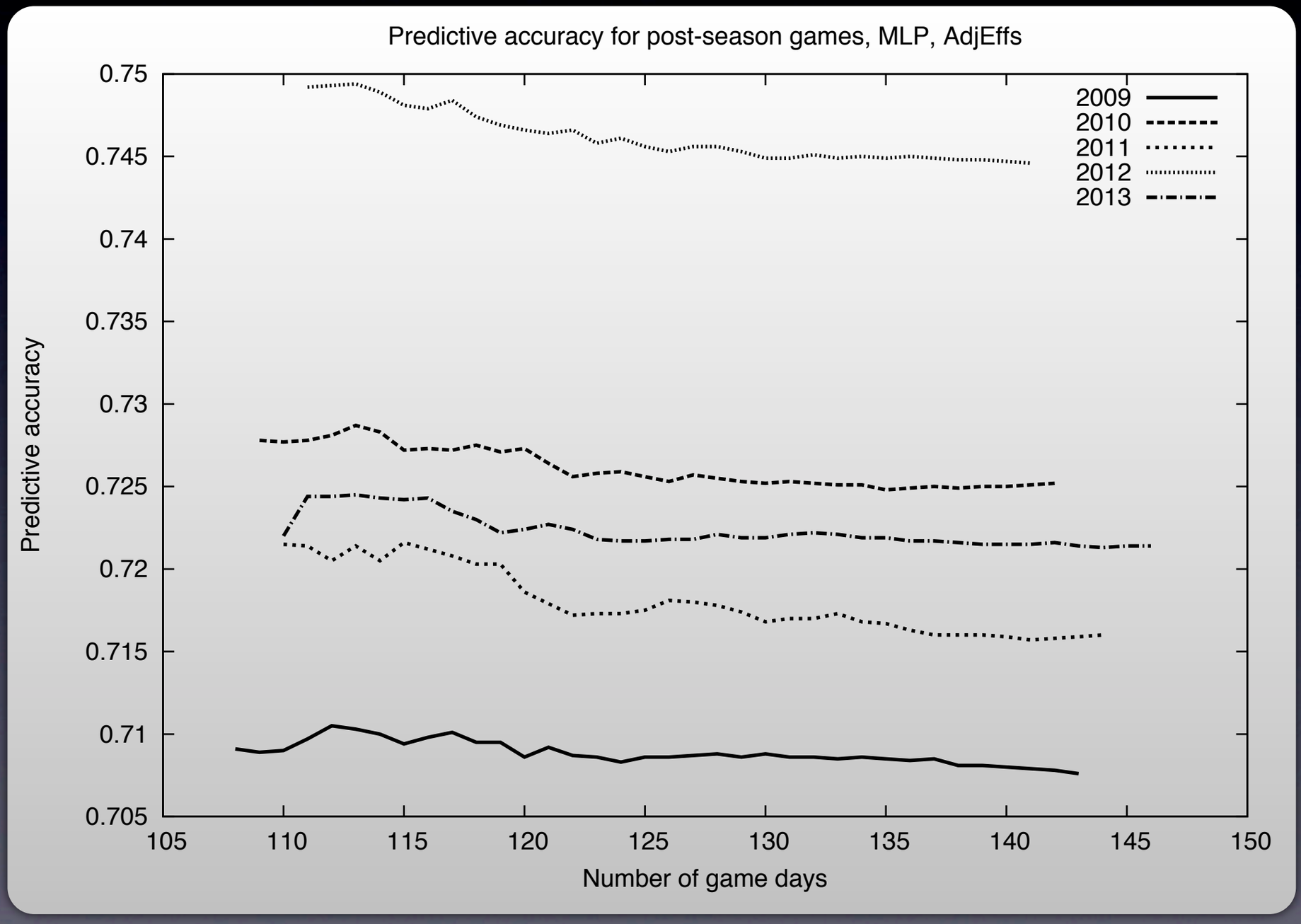

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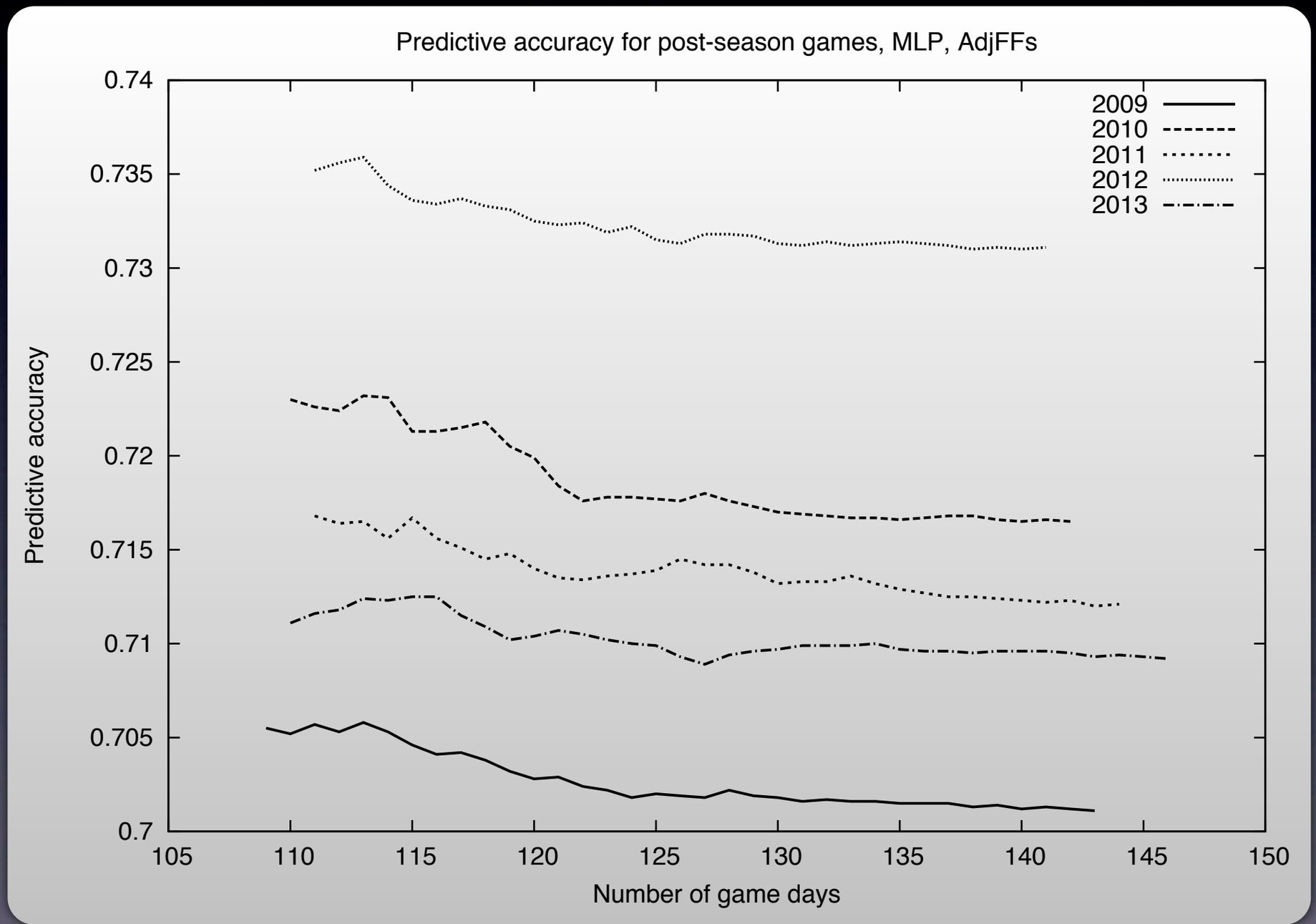

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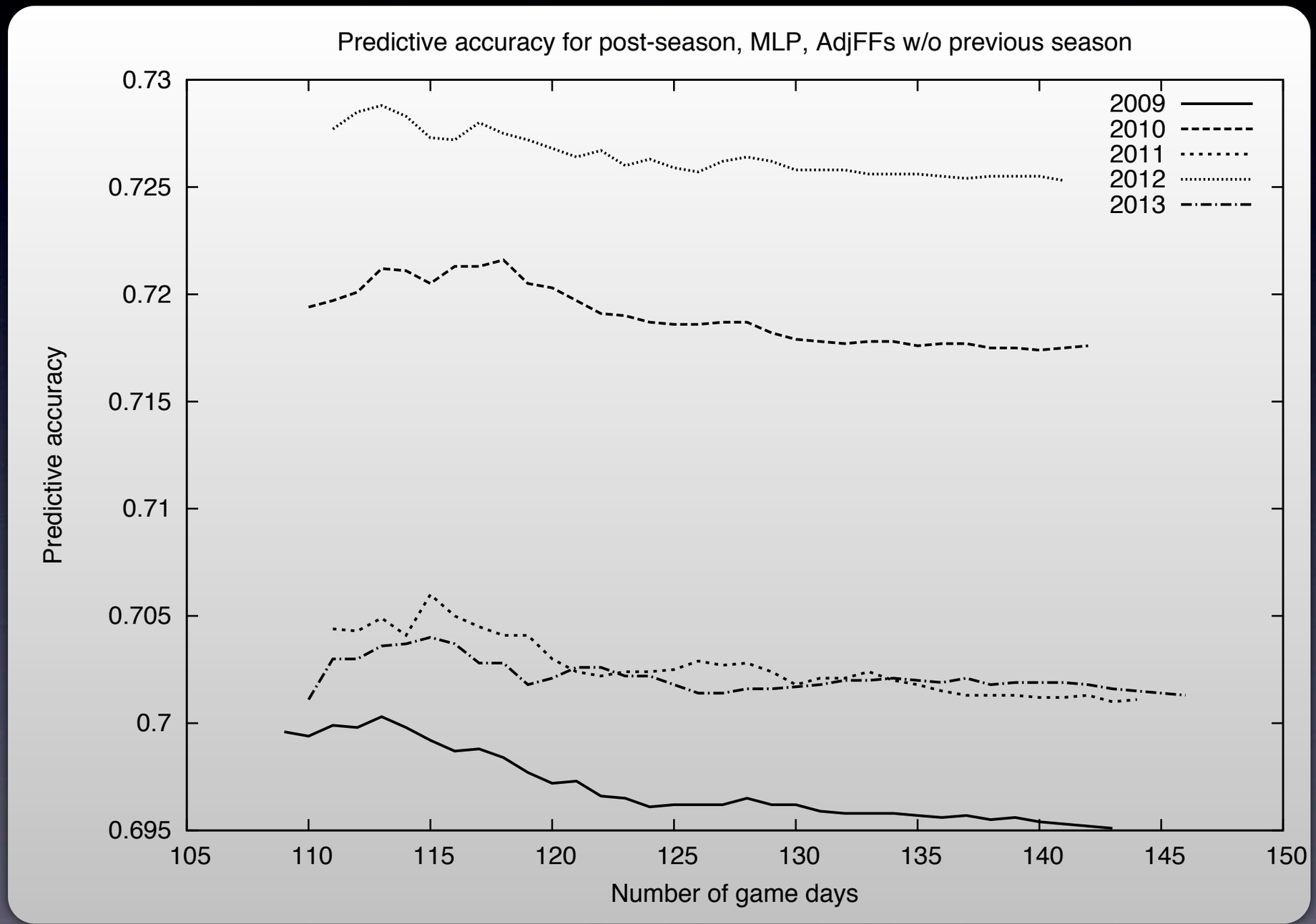

Naive Bayes

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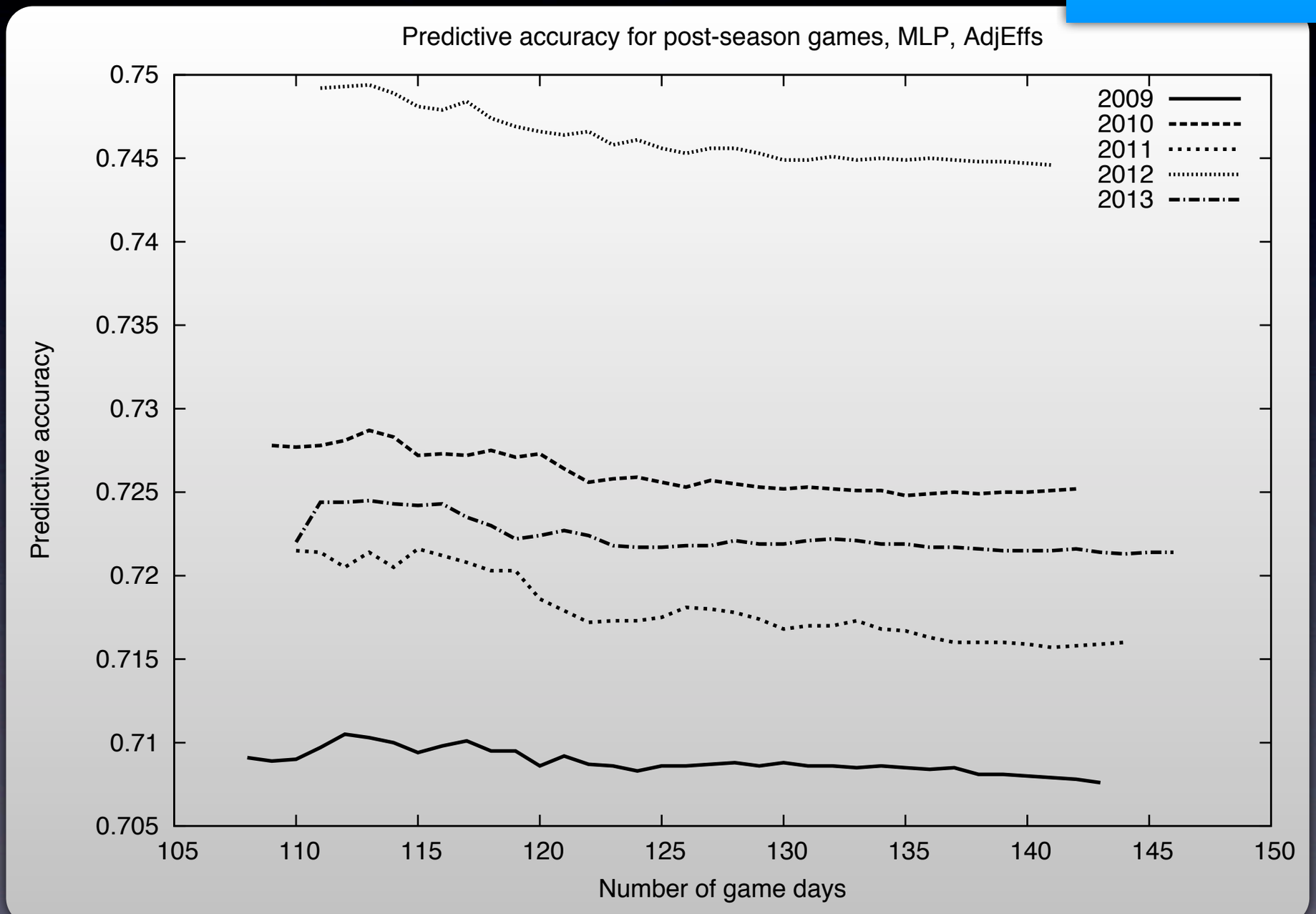

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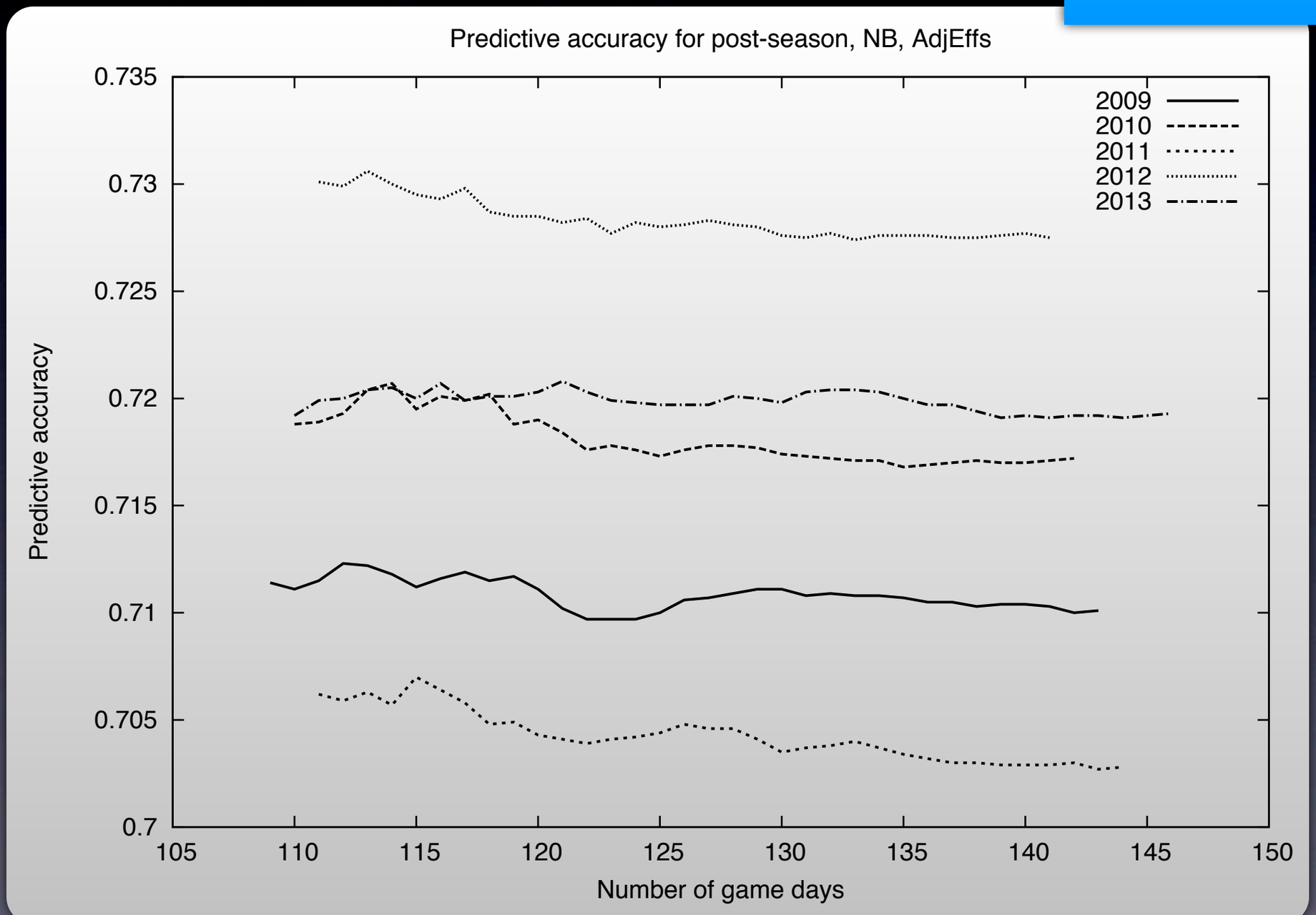

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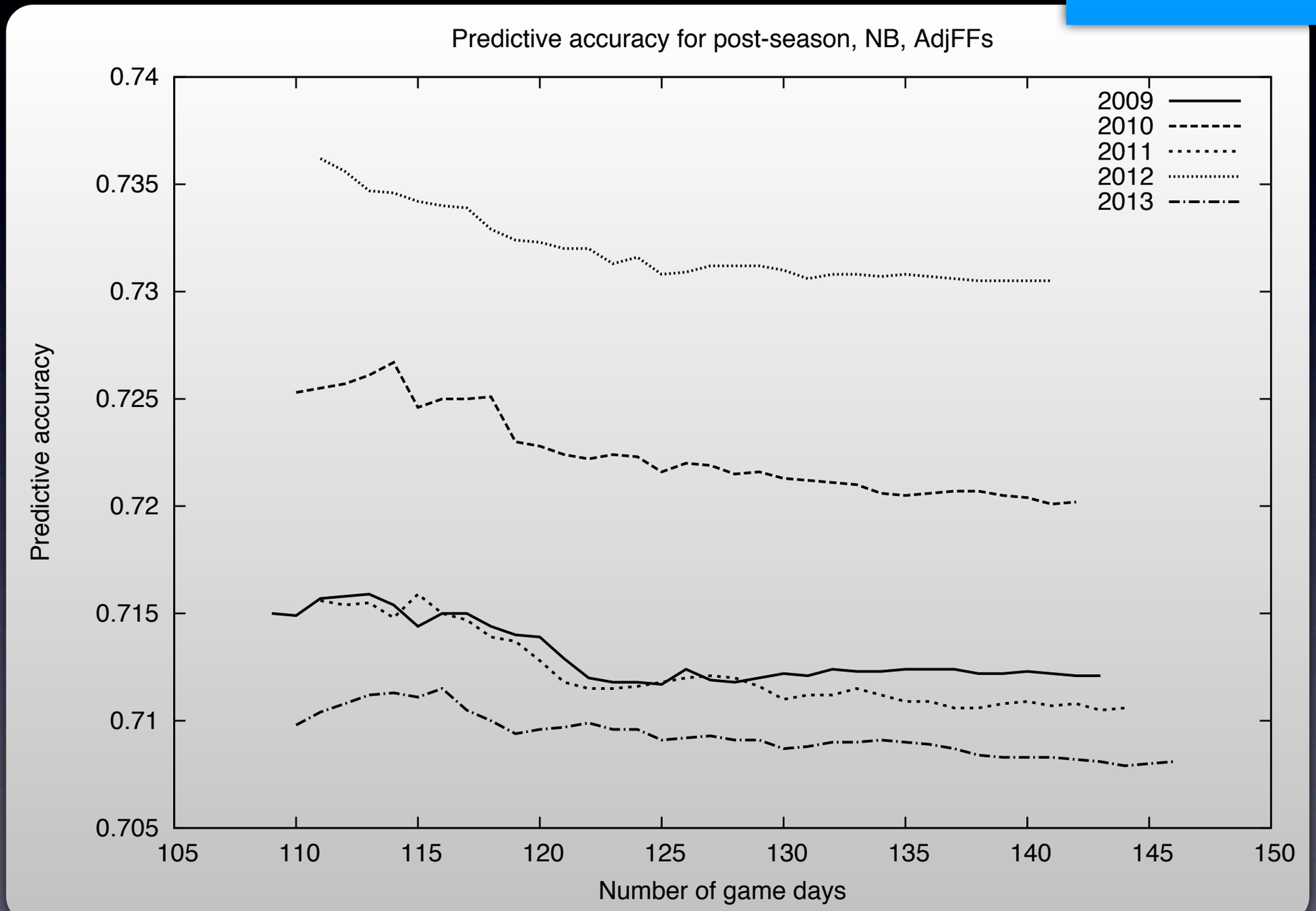

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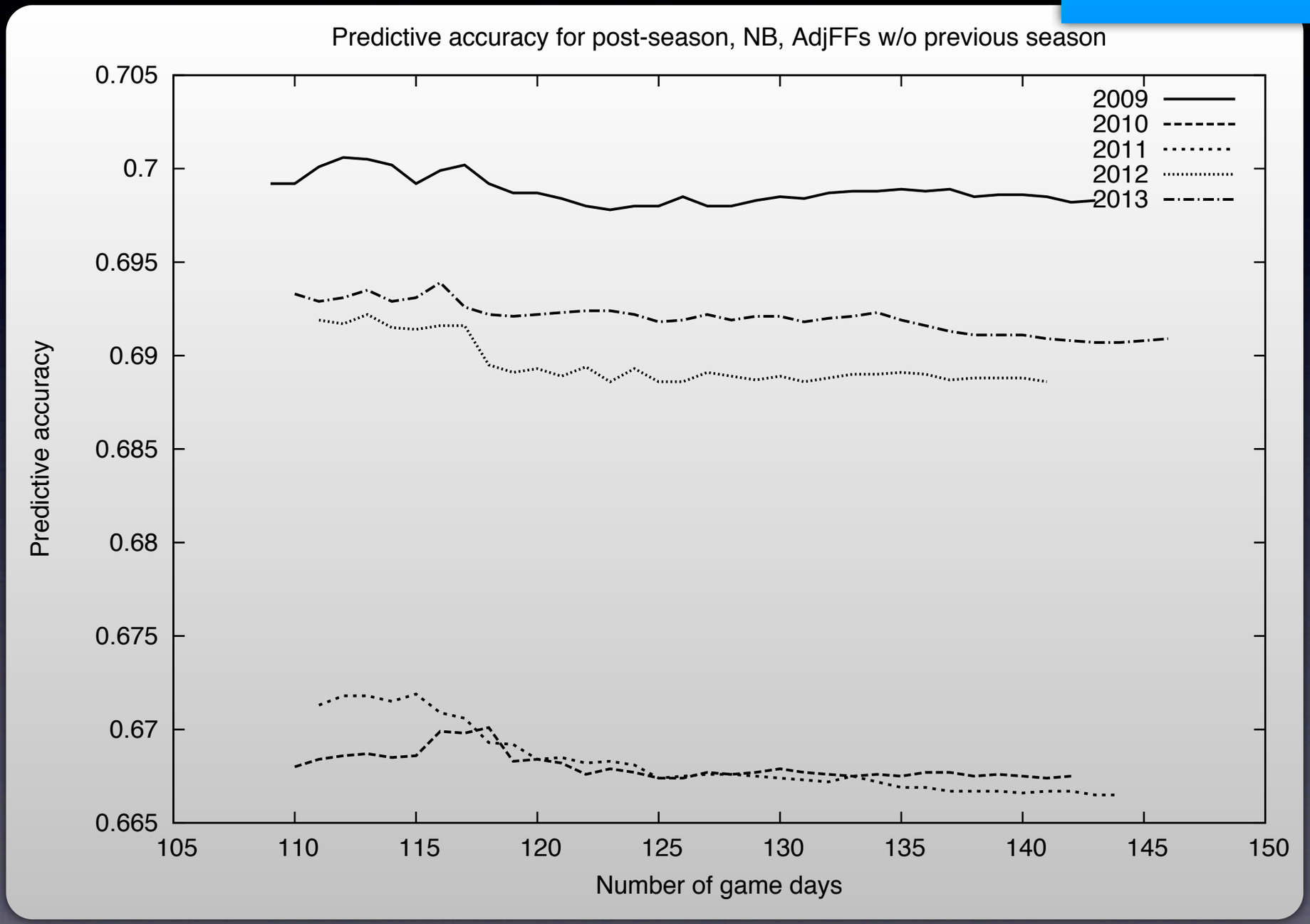

Lesson 2: there might be a class ceiling

- ~ 75% rarely exceeded
- Holds for other sports as well (NHL, Soccer, NFL)

Next steps

Better attributes

- Team stability/experience

Focus on mis-classifications

Sequential classification

- Concept drift?

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Season	MLP
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2010	72.5%
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More lessons?