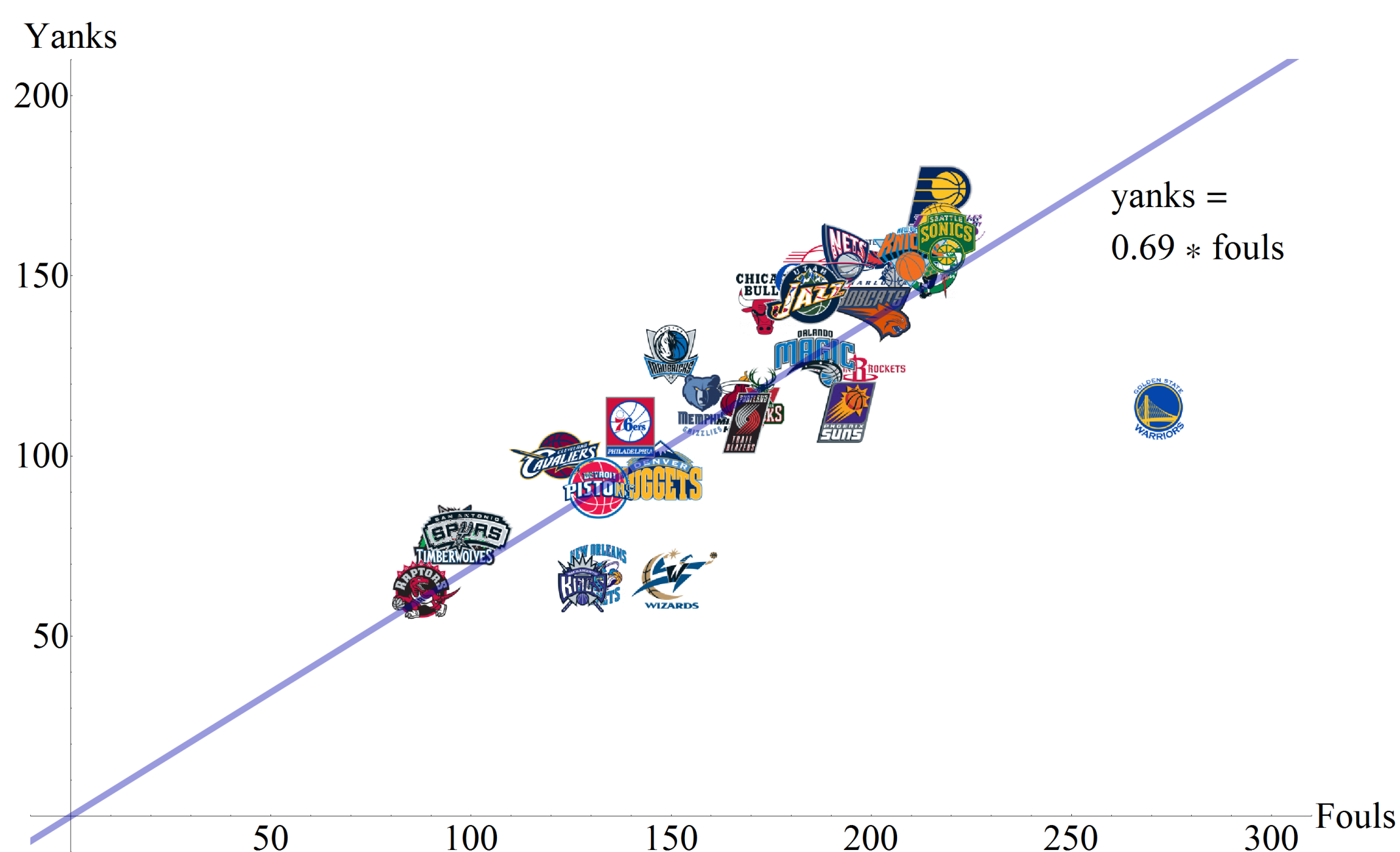
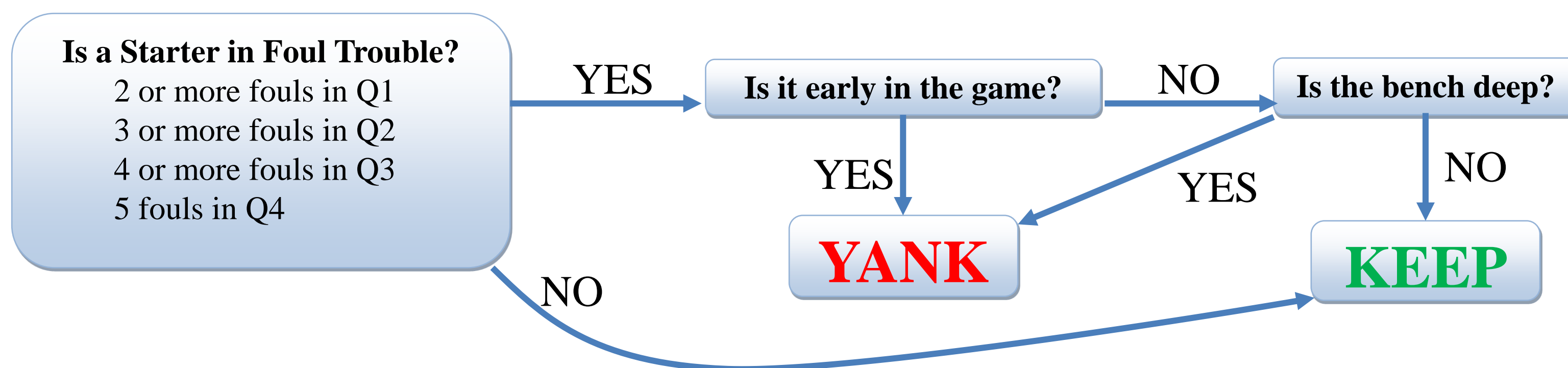




How Much Trouble is Early Foul Trouble?

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The Golden State Warriors are the biggest outlier by two measures: they had the most threshold fouls, so they are further to the right on the graph, and they had the fewest yanks per threshold foul, so they have the lowest slope.

The Washington Wizards had the second lowest slope, and the average slope was 0.69.

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“Win Probability” Model

Advantages of “Win Probability”

1. Estimates the probability of winning for a team at any given point in time.
2. Easy to add other state information that might affect the probability of winning.
3. Automatically dampens the effects of early game actions when the variance is greater.
4. Automatically lessens the importance of data points where the game has already been decided.

$$F_t = \alpha + \beta_\ell \ell_t + \beta_P P_t + (1 - t) \left(\mu + \sum_{i=1}^{29} \beta_i D_{it} + \beta_{STA} STA_t + \beta_{FTR} FTR_t \right)$$

	Constant α	Lead β_ℓ	Drift μ	Poss. β_P	Volatility γ	Starters β_{STA}	Fouls 1 β_{FTR}
2006-2007	-0.0195 [-0.91]	0.0543 [18.14]	0.2851 [4.95]	0.0278 [1.58]	0.9937 [1.21]	0.0176 [0.47]	-0.0619 [-0.29]
2007-2008	-0.0074 [-0.36]	0.0537 [18.21]	0.3461 [5.92]	0.0284 [1.61]	0.9980 [0.97]	-0.0194 [-0.50]	-0.1353 [-0.59]
2008-2009	0.0028 [0.13]	0.0548 [17.67]	0.3784 [6.32]	0.0301 [1.70]	0.9973 [0.81]	0.0141 [0.35]	-0.1295 [-0.55]
All 3 Years	-0.0095 [-0.77]	0.0553 [32.41]	0.3074 [9.28]	0.0289 [2.83]	0.9959 [1.78]	0.0101 [0.46]	-0.1174 [-0.92]

Conclusion: “Our analysis shows that a starter in foul trouble should be yanked from the game, supporting the conventional wisdom of NBA coaches. Every starter playing in foul trouble is worth two points to the opposition.”