



Laplace Uncertainty

A band around every probability, from the curvature of the likelihood at its optimum.

The fitted parameters have a covariance: the inverse Hessian of the negative log likelihood. Draw from it, re-price, and you have a distribution over prices rather than a single number.

SPORT

Football

FAMILY

Match pricing

LICENCE

£299

one-off, perpetual

RUNNING IN THE PLATFORM

<https://edgewortharena.com/arena/api/match?home=arsenal&away=chelsea&comp=E0&uncertainty=1>

Inputs

NAME	TYPE	UNITS	WHERE IT COMES FROM
fit	fitted model	-	the Match Price Engine
matches	the weighted match list the fit used	-	the same source
draws (optional)	int	count	your choice; 400 is enough for a 90% interval

Outputs

NAME	TYPE	UNITS	NOTES
covariance	k x k array	-	
interval	(low, high) per outcome	probability	
width	float	probability points	what the Predict page calls How sure

Method

- 1 Compute the Hessian of the weighted negative log likelihood at the optimum by central differences.

THIS IS THE SAMPLE

The method runs to 3 steps; one is shown. The assumptions, the limits, the module layout and the reference implementation come with the licence. Everything on the page below this -- what the model was measured at -- is the same in both versions, because that is the part you should not have to take on trust.



What it was measured at

The band is reported on every price the Arena serves; these are its properties rather than a score.

MEASURE	RESULT	READING
Interval	90%	on the favourite's probability, from the parameter covariance
Draws	400	from the multivariate normal at the optimum
Typical width, established side	3 to 5 points	several seasons of matches behind the fit
Typical width, promoted side in August	10 to 15 points	which is the point of printing it
What it does not cover	model error	for coverage that survives the model being wrong, licence the conformal sets

Assumptions

What has to be true for the numbers to mean what they say.

- The likelihood is approximately quadratic near its optimum, which is the usual large-sample argument and is weakest for teams with few matches.

Limits

Where it is known to be wrong. Published because a model without stated limits is one nobody has pushed on.

- It is parameter uncertainty only. It says nothing about the model being the wrong shape, which is the larger error.

LICENCE

Issued to Evaluation copy. One perpetual licence to use and modify this model inside your own organisation. Redistribution of the specification or the reference implementation is not included. No warranty is given: the validation above is the whole of the claim being made.