Comparison of means of creating the experiment input

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Description

Comparing various means of creating inputs for 60 hours of gal1 experiment:

- Random galactose value (between 0 and 2) for each period of 60 mins
- Optimally choses galactose value for each period 60 mins - whole input designed in advance before experiment starts to run.
- Optimally choses galactose value for each period 60 mins - whole input designed in advance before experiment starts to run. This time using log transform for all parameters other than h1.
- Designed - 61 steps from 0 up to 2 and back down again.

In each run the initial conditions are randomly chosen in the range 0.1 x truth to 10 x truth. The random distribution is an even distribution in the log scale, so half the distribution is in range [truth .. 10 x truth] and half in the range [0.1 x truth .. truth].

All experiments are in git repository: git@github.com:csynbiosys/AMIGO2R2016b.git

The random experiment is branch Experiment-Ventress commit 7227eaa63069ff921a48764fa8bd12dc6e2a2ec3.

The OID experiment is branch Experiment-CadBane commit f475047ece093b66ed23b66b701dd6565cfa6c69.

The OID experiment using log transforms for all parameters except h1 is branch Experiment-CadBane commit d5926d0843607ae74bdc114850232d4af03b6ded.
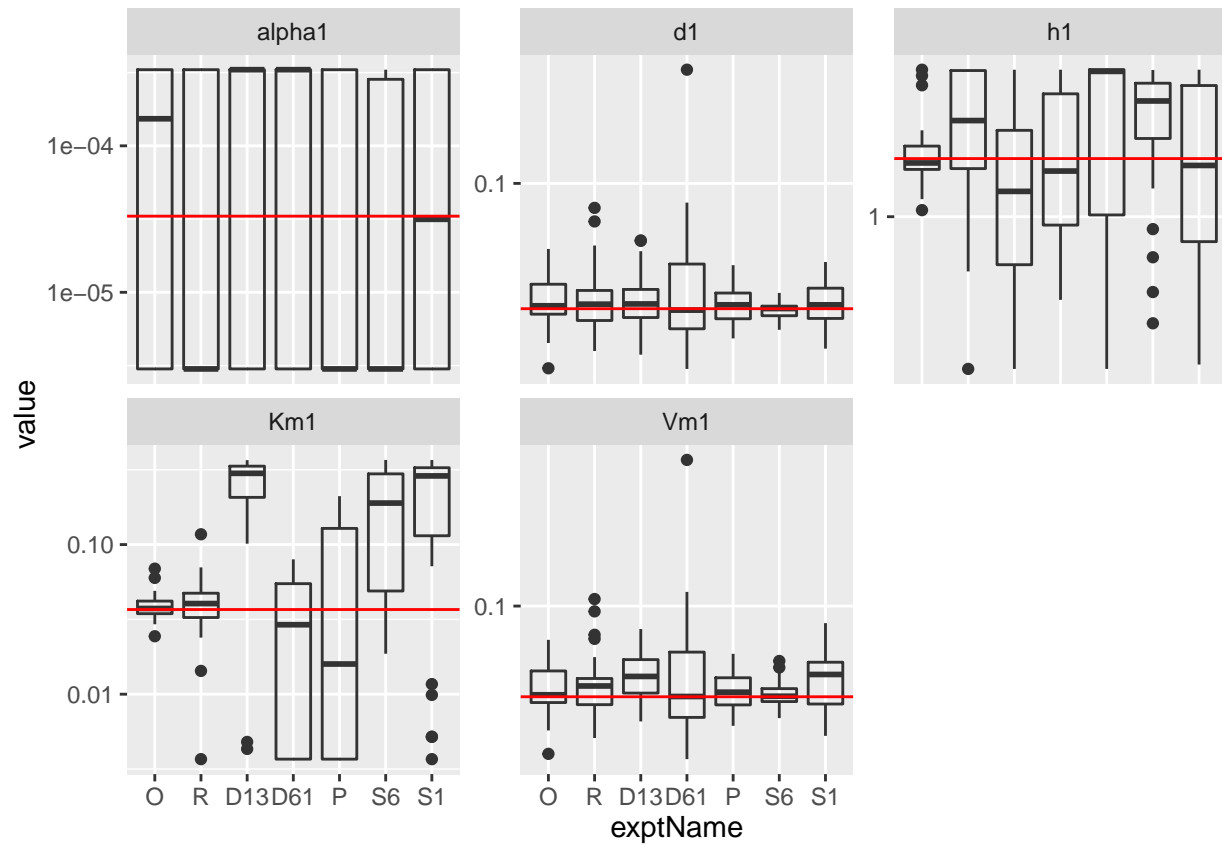
Number of runs

exptName	exptLabel	n
O	OID 1 Loop (CadBane)	30
R	Random (Ventress)	30
D13	Designed 13 (Lobot)	30
D61	Designed 61 (Biggs)	30
P	Pulse (MaxKanata)	30
S6	Steps 6 hour (Hondo)	30
S1	Steps 1 hour (Phasma)	30

Fitted parameter values after final hour

The final fitted parameters for each method after 60 hours of experiment.
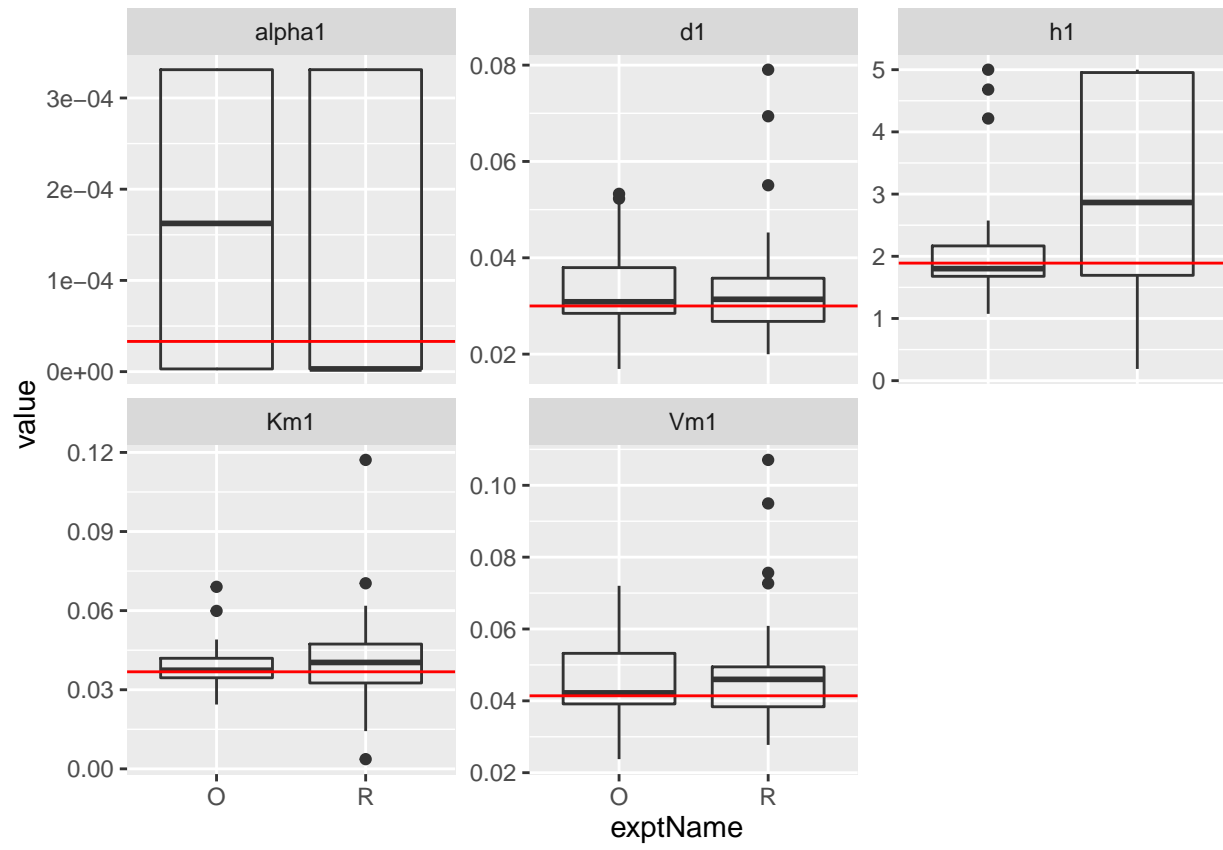
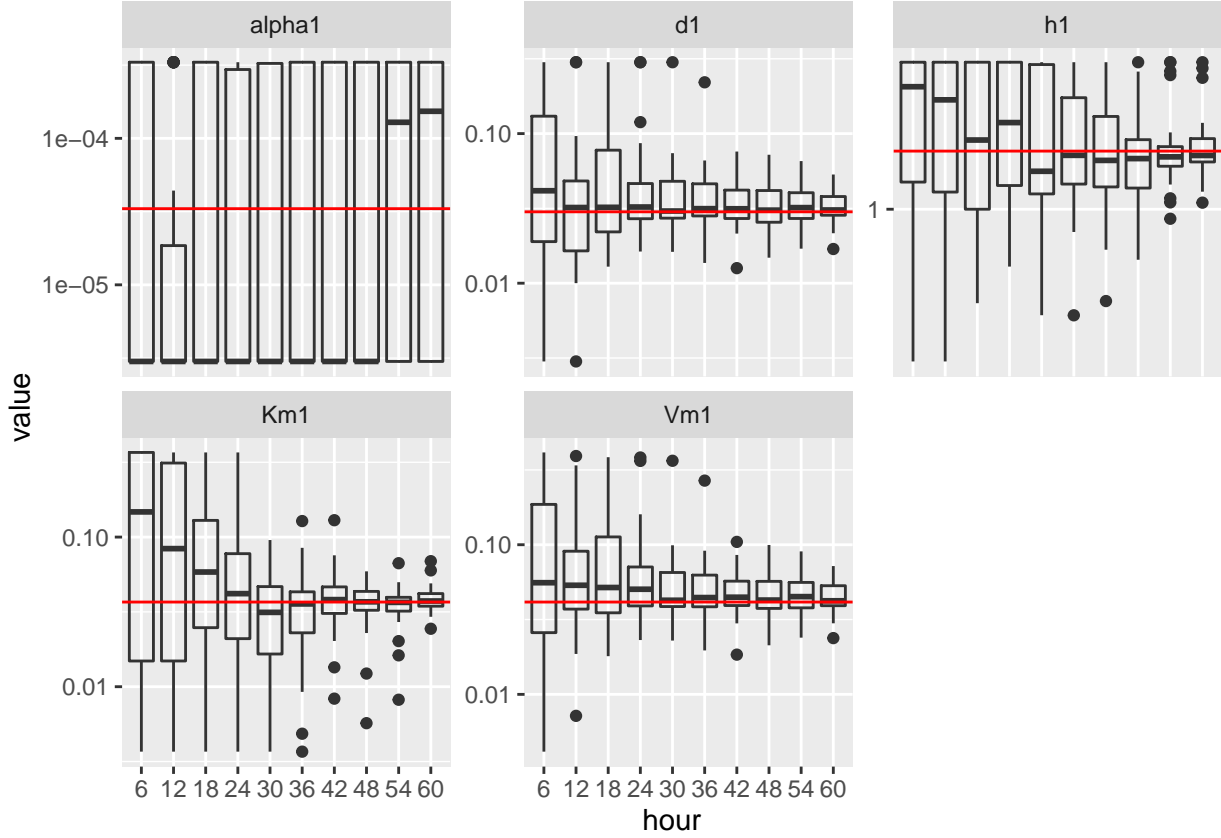TODO: The y-axis for some of these need not values.

Optimal Input Design (OID) is the best overall.

Focusing on just OID and Random to zoom in a little more:

TODO: Again the y-labels here are very poor.

Convergence of OID method

Relative confidence intervals after the final hour

Relative confidence intervals for each parameter by experiment. We have to be a little careful about these numbers because sometimes they are not produced and sometimes they are zero (which seems incorrect). The data used to produce these is:

exptName	exptLabel	param	n
O	OID 1 Loop (CadBane)	alpha1	30
O	OID 1 Loop (CadBane)	d1	30
O	OID 1 Loop (CadBane)	h1	30
O	OID 1 Loop (CadBane)	Km1	30
O	OID 1 Loop (CadBane)	Vm1	30
R	Random (Ventress)	alpha1	30
R	Random (Ventress)	d1	30
R	Random (Ventress)	h1	30
R	Random (Ventress)	Km1	30
R	Random (Ventress)	Vm1	30
D13	Designed 13 (Lobot)	alpha1	23
D13	Designed 13 (Lobot)	d1	23
D13	Designed 13 (Lobot)	h1	15
D13	Designed 13 (Lobot)	Km1	14
D13	Designed 13 (Lobot)	Vm1	10
D61	Designed 61 (Biggs)	alpha1	30

exptName	exptLabel	param	n
D61	Designed 61 (Biggs)	d1	30
D61	Designed 61 (Biggs)	h1	30
D61	Designed 61 (Biggs)	Km1	30
D61	Designed 61 (Biggs)	Vm1	30
P	Pulse (MaxKanata)	alpha1	30
P	Pulse (MaxKanata)	d1	30
P	Pulse (MaxKanata)	h1	30
P	Pulse (MaxKanata)	Km1	30
P	Pulse (MaxKanata)	Vm1	30
S6	Steps 6 hour (Hondo)	alpha1	25
S6	Steps 6 hour (Hondo)	d1	25
S6	Steps 6 hour (Hondo)	h1	16
S6	Steps 6 hour (Hondo)	Km1	17
S6	Steps 6 hour (Hondo)	Vm1	11
S1	Steps 1 hour (Phasma)	alpha1	24
S1	Steps 1 hour (Phasma)	d1	24
S1	Steps 1 hour (Phasma)	h1	19
S1	Steps 1 hour (Phasma)	Km1	15
S1	Steps 1 hour (Phasma)	Vm1	14
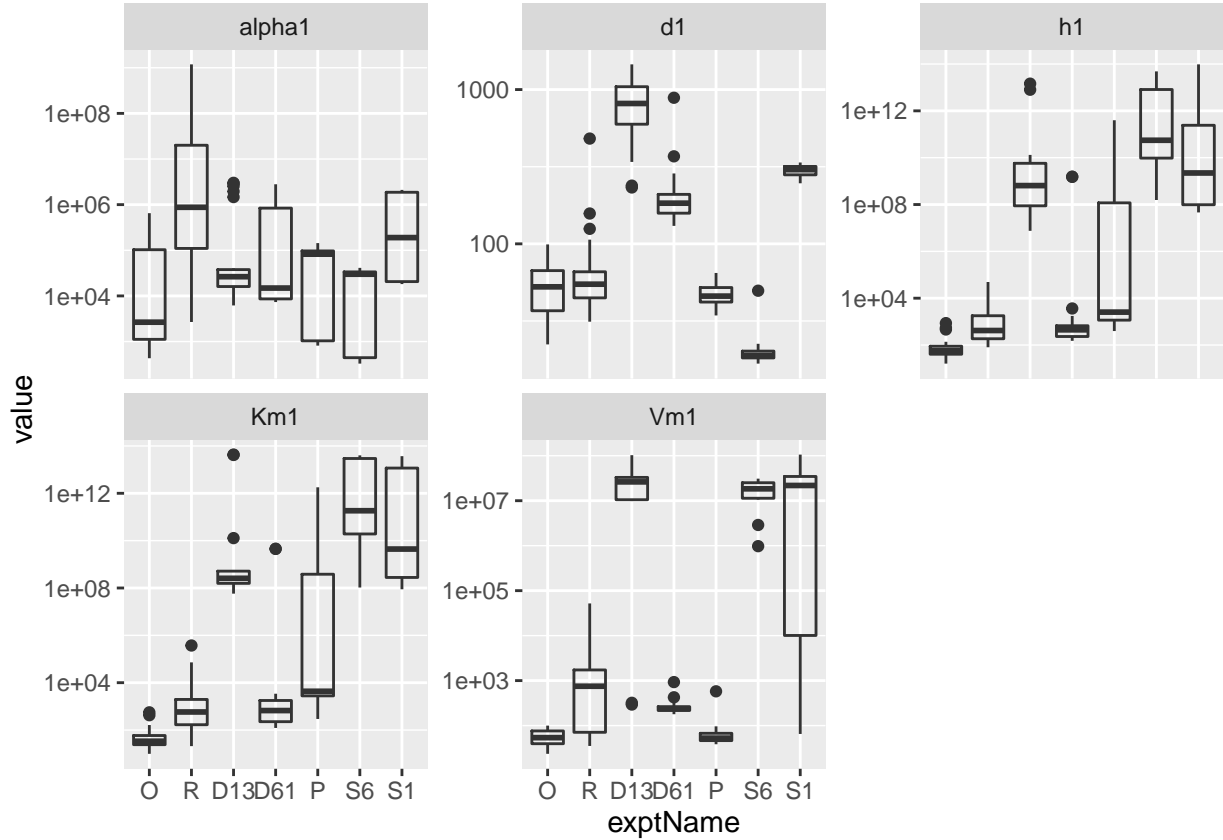
Focusing on just OID to zoom in a little more: