Introductions to the mathematical models of growing systems dynamics complexes portieres residuals gains

Introduções aos modelos matemáticos dos complexos dinâmicos dos sistemas em crescimento

DOI:10.34117/bjdv6n10- 628

Recebimento dos originais: 08/09/2020
Aceitação para publicação: 28/10/2020

Cristian Epifanio Toledo
Doutor em Engenharia Agrícola
Universidade Estadual de Goiás, Instituto Acadêmico de Ciências Agrárias e Sustentabilidade
Campus Oeste - Unidade Palmeiras de Goiás, Goiás – Brazil – CEP: 76190-000
E-mail: cristian.toledo@ueg.br

João Mohn Nogueira
Mestre em Engenharia Agrícola
Universidade Estadual de Goiás, Instituto Acadêmico de Ciências Agrárias e Sustentabilidade
Campus Oeste - Unidade Palmeiras de Goiás, Goiás – Brazil – CEP: 76190-000
E-mail: jcmnogueira1@gmail.com

Aluíso Fernando Alves Ferreira
Especialista em Zootecnia
Universidade Federal de Goiás - UFG, Departamento Zootecnia, Campus Universitário
Samambaia, Goiânia, Goiás – Brazil – CEP 74690-900
E-mail: ferreira.consult2020@icloud.com

ABSTRACT

Hypothesis are effects agriculture-pastoral-forest-integrate systems utilization supplement, illustration differences and ourselves characteristics form production in behaviors, compare a performance and yours residual variables. We are conductress a simulation studies compares the supplement intensities in system dynamics for agriculture-pastoral-systems appliances predictions, residual gains and intakes for model from pastures. Thirty-six bulls, crossbreed ½ Nellore x ½ Holstein, age 24 mouths, 273 kg (SD±17) were selected and assigned to 4 blocks based on parity and growled yield with 4 bulls in a block, paddock in the block, and then the 4 bulls in a block were randomly allocated into 4 groups, and fed basal diets supplemented with different doses of supplement iso protein: energetic at the levels of 0, 0,25, 0,5, 0,75 or 1 kg DM, respectively. Indicates an included predictor, based on the optimal from condition the simulation appliance, we have learned a lot about the dynamics for this type appliance have been studied net efficiency enforced restrict ingestion relatively modified distribution hyper positively, by compared algorithms even on relatively simple effectively two situations efficiency energy appliance choosing the over-fitness member is second relative response to primer selections. We come back to correlation and show in model dynamics in systems.

Keywords: crossover, express, mob, penalization, rank.
RESUMO
Hipóteses são efeitos suplemento de utilização do sistema integração lavoura pecuária floresta, diferenças de ilustração e características de nós mesmos da produção em comportamentos, compare um desempenho e suas variáveis residuais. Foi conduzindo um experimento que compara as intensidades de suplemento em sistema agro-silvo-pastoril, ao qual os ganhos residuais e consumos foram avaliados em sistema intenso de pastagens. Trinta e seis touros, mestiços ½ Nelore x ½ Holandês, idade 24 meses, 273 kg (DP ± 17) foram selecionados e atribuídos a 4 blocos com base na paridade e rendimento de ganho residual, causalizado 4 bois por bloco, sendo unidade animal e piquete unidade experimental e alimentados com dietas basais suplementadas com diferentes doses do suplemento isoproteico e energético nas doses de 0, 0,25, 0,5, 0,75 ou 1 kg MS, respectivamente. Eficiência líquida foi indicada como um preditor com base no ideal na condição do modelo aplicado em sistema dinâmico aplicado nas restrições de ingestão ao qual a alta correlação foi positiva para os algoritmos comparados, que foram relativamente eficiente para os grupos avaliados. O modelo de eficiência residual foi uma resposta relativa para as seleções.

Palavras-chave: cruzamento de informações, expresso, mobilidade, penalização, rank.

1 INTRODUCTION
Effects environmental can make provide options by utilization in scale supplement and agriculture-pastoral-forest-integrate system illustrate linear regression problems management is environmental conducing a qualitative given techniques are often used to guard against over-fit and to select animals to relevant for predicting systems. Introduction to the mathematical modeling of the dynamics appliance animals to long times for effects tracks is in general parameters similarities the cost relatively if price with the time and a return over manger nets. A insufficient exploratory give qualitative in system high carbon procedure applicability features of the dynamics, although it does not give a good quantitative agreement with simulations for performance and productively hectares.

Analysis regression for quality meat beef cattle is one of the main statistical techniques often using in the field variable integral factorial physiologic to determine the effectively of a set of predictors is often large, which: race, age is sex. Input several extrinsic, what are management, nutritional is environmental. Measurements including physiologic health assessments variables relating to financial status resulting in an extremely large set qualitative technological and meat quality censorial (Phillipe et al. 2020).

Quantitative forage and modeling mathematical animal for production, is to gain insights into how things work, sending a relation genetics algorithm, qualitative forage and modeling animal and what are the optimal parameters in response for potential express additional qualitative, track paddock, good model should retain the essential process, express terminate, large this distribution plain management forage, approximate liner quantitative is qualitative mass, select mechanism leaf
point, select supplement isotopic nutritional, favorable calculate the effect of selection on the average paddock and average residual body weight, variable we need only perform integrals to body residuals (Allen et al., 2011; Bach et al., 2005; Berry, 2012).

Hypothesis are effects agriculture-pastoral-forest-integrate systems utilization supplement, illustration differences and ourselves characteristics form production in behaviors, compare a performance and yours residual variables.

We are conductress a simulation studies compares the supplement intensities in system dynamics for agriculture-pastoral-forest-integrate-systems appliances predictions, residual gains and intakes for model from pastures.

2 MATERIAL AND METHODS

The studied was conducted in Farm Good Verdean, in municipality Waterfall Golden, in south of state from Goias (altitud 459 m, longitudinal 49°28'30"W and latitudinal 18°29'30"S) from accorded with an classification Köppen and Geiger (Aw). The average annual from precipitation was 1.200 at 1.500 mm.

Thirty-six bulls, crossbreed ½ Nellore x ½ Holstein, age 24 mouths, 273 kg (SD±17) were selected and assigned to 4 blocks based on parity and growled yield with 4 bulls in a block, paddock in the block, and then the 4 bulls in a block were randomly allocated into 4 groups, and fed basal diets supplemented with different doses of supplement isoproteic:energetic at the levels of 0, 0,25, 0,5, 0,75 or 1 kg DM, respectively.

All bull were housed in a paddock, and fed at 0630, 1400, and 1930 h every day. All bulls had free access to drinking water, divided into two groups of eight animals that represented 4.29 animal unit ha⁻¹. The experimental area consisted of 28 paddocks of 400m² (totaling 1.2 ha) of Brachiaria brizantha cv. Marandu grass with natural shading available, and supplement trough with space of 45 cm animal⁻¹.

Feed was given in excess to allow 5% orts during the experiment. The supplement was added once per day at 0630 h by scattering it on the total mixed ration for individual bulls. The experiment lasted for 12 weeks, with the rest 2 weeks for adaptation. During adaptation stage, was not supplemented to bulls.

The Nitrogen was applied at the end of each grazing cycle; i.e., 2 kg of urea per paddock, by which was equivalent to 100 kg of N ha⁻¹ year⁻¹ as suggested by Da Silva (2012). The paddocks were subjected to an adaptation grazing period. Moreover, during drought periods we employed irrigation during one hour twice a week (i.e., equivalent to 50 mm monthly).
Collect dates

Were collects at sampled, utilized one are squad 1m² with cut in biased forage. Forage and soil samples collected twelve points an every 28 days.

The vigor give planted evaluated through stock rate on produced give dry matter to 21 days hereafter cuties and a revelation of day what initial an entire of first cut, available a quantity mass: forage mass \([\text{kg/ha}^{-1}]\) and residues \([\text{kg/ha}^{-1}]\).

The treatments were Brachiaria brizantha cv. Marandu grass with natural only completely randomized design with twelve replicates. Reasonable predictions usually were dependency upon the numbered of testers to be assigned to each based-forage and the productively of the based-forage.

Accurately numbered steers experiment permitted at higher mean between lower squad mean error. Stocked rates grazed management and five based-forage per treatment, analyst quality and quantity. Numbered testers put and taken pasture per treatments necessary for hider an eighteen intercepted changed for detected at difference between the system, utilized in calculated 38.46 per cycle pastures on an area from five hectares.

Initial and final fasted weights (i.e., feed and water withheld for 16h) were obtained before to start and at the end of each grazing cycle (28 days), and then the weight gain (kg animal\(^{-1}\)) per grazing cycle was calculated by the difference between final and initial weights. Moreover, the daily weight gain (kg animal\(^{-1}\) day\(^{-1}\)) was accounted from the weight gain per cycle divided by twenty-eight days. The supplement intake was obtained subtracting the number of supplements offered during the grazing cycle and leftovers collected at the feeders.

Type of measurement and number of animals per based-forage, quality [average daily gain] and quantity [TDN per hectare], for four bulls per pastures. Evaluated quality: forage accumulated \([\text{kg/ha}^{-1}]\), paddock [ha] and [TDN per hectare]: \(C = \text{error of a based-forage mean for averaged daily produced per steers expressed as coefficient of variation}; \) \(C' = \text{error of a based-forage mean for yield of TDN per hectare}; \) \(t = \text{length of grazed period in days}; \) \(a = \text{numbered of differentiated steers grazed the based-forage dried the trials}; \) \(d = \text{numbered of steers days the based-forage was grazed and} \ s = \text{pasture size in hectare}.

Analysis laboratory

The grass biomass was determined before the animals to enter the paddock. The analyzes were carried out to determine the dry matter. Mixed samples of grass from each grazing cycle were collected to determine levels were analyzed for DM \((105^\circ\text{C} \text{for 5 h})\), crude protein \((\text{method 988.05; AOAC, 1990})\), crude ash \((\text{method 942.05; AOAC, 1990})\), and acid detergent ber (ADF) \((\text{method})\).
Content of neutral detergent fiber (NDF) was analyzed with method described by Van Soest et al. (1991) with the addition of sodium sulfate and amylase.

An ANKOM 2000 fiber analyzer (Ankom Technology Corp., Macedon, NY, USA) was used to extract and liter NDF and ADF, respectively. The value for NEL: 2.5 Mcal Day in the experimental diet was estimated based on the Large Ruminant Nutrition System (LRNS) model using the (2016). The ingredient and nutrient composition of the experimental diet are listed in Table 1 and 2. The BW was estimated at the beginning and the end of the trial with method described by Yan et al (2009). The bread flour yield was recorded on d 6 and 7 of each week, and bread flour samples were collected on d 7 using bread flour-sampling devices. The performance yield was recorded on d 28, and samples were collected.

**Statistic**

The effect of supplement on DMI, performance of bulls were analyzed using the MIXED procedure in SPSS software version 2012 (SPSS Institute Inc., Cary, NC), with correlation linear type AR (1) for repeated measures analysis. A randomized block design with repeated measures was used for the analysis, treatment, interaction of treatment x wk and block as the main effects and heifers within the diet as a random effect. The linear effect of treatment on the variables were evaluated with orthogonal polynomials accounting for unequal spacing of bread flour supplement levels. The results were listed as least squares means and were separated using curtness the option when the fixed effects were significant. P < 0.05 was denied as statistical significance, and 0.05 ≤ P < 0.10 considered as tendency of significance.

**3 RESULTS**

The main of mathematical modeled, presentation (Tabel 1) is to high gain increase body weight, insights into how residual from nitrogenous appliance in system and loss environmental, addicted net energy per gain body weighted fitness, things work. For genetic gain algorithms we was liked to know what no problems area, to what representation and operators to used, and what were the optimal parameters settings.

Modelling will not give precise answers to these questions as they no dependency on the problem being cross-validation in systems, into at practical necessary intended accurate model we can convince ourselves.

The value frequency is mean, models should retain the essential features of the process being modeled but with the minimum of necessary detail in relation to maximum.
what follows we start from a minerals model, adding details as we delve deeper into what is happened to gain from our efforts, which in generally, we might expect to compare different strategies such as steady-state increased voluntary consumption addicted stochastic global over optimal parameter actually searches a complex space pastures.

Table 1. Continuous predictors standardized variables treatments

| Variable | 1     | 2     | 3     | 4     | 5     |
|----------|-------|-------|-------|-------|-------|
| N        | 36    | 36    | 36    | 36    |       |
| μ        | 0.922 | 0.528 | 0.255 | 0.303 |       |
| s        | 0.412 | 0.281 | 0.161 | 0.192 |       |
| Minimum  | 0.901 | 0.158 | 0.248 | 0.265 |       |
| Maximum  | 0.937 | 1.083 | 0.277 | 0.350 |       |

**Mean and squad error mean significantly at the 0.05 < P > 0.10 levels (2-tailed).**

How to models – named the parts, we considerable the counted problems the objective is to maximum the number of animals appliance, denote the fitness experiment by simple generational genetic is supplement addicted, involved given selection, penalization, rank to members of the population by formation, which were random and the filter is modified to change by state between frequency, random, controlled, mean, parameters, complementary introduction, recombination the new population and set equal after selection.

Table 2. Fitness models appliance the parts

| Variable | μ     | s     | F.A  | F.R (%) | F.A (%) | V.C % |
|----------|-------|-------|------|---------|---------|-------|
| supplement | 28.81 | 0.65  | 3    | 3.33    | 3.33    | 2.25  |
| water    | 2.97  | 0.14  | 7    | 7.78    | 11.11   | 4.71  |
| supplement | 47.76 | 0.51  | 11   | 12.22   | 23.33   | 1.36  |
| water    | 6.53  | 0.31  | 24   | 26.67   | 50.01   | 4.74  |
| supplement | 66.71 | 0.47  | 221**| 24.44   | 74.44   | 0.97  |
| water    | 8.91  | 0.42  | 11** | 12.22   | 86.66   | 4.71  |
| supplement | 85.66 | 0.35  | 8    | 8.89    | 95.55   | 0.75  |
| water    | 11.88 | 0.61  | 4    | 4.45    | 100.01  | 4.71  |

**Mean and squad error mean significantly at the 0.05 < P > 0.10 levels (2-tailed).**

Over-fitness models appliance the parts, shows the distribution of fitness for a population evolved under selection to supplementation:water, increase the overall trend is cleared, lines squad give (Table 2) ternary population is initially widely distributed frequency mean over-fitness of a random steps increased while the width of the population introduction. Cleared many to the details, such as the small loss supplement is appliance ingested water on scale fluctuations, will variable from return cycle in processing by production. One obvious feature is that this is substantial fluctuation from typically differ between others, do we ignore the fluctuations to model random is specific parameters is to model an ensemble of fluctuations the supplement and water. In parallel as
properties to model a large finite set of populations appliance evolved in parameters quantitative, of the ensemble won’t fluctuate, between the members of the populations concentrates.

We can calculated how these genetic is supplements operators an arbitrary set of ensemble variables. Therefor started from an initial ensemble interactively appliance each operations animals in turn to predict to evolution supplement.

Introduction selection is supplement of systems diversification with composted exactly proportional to the rank, it is well know that the variable selection mechanism give similar results, the probability distribution of the winner is properly normalized, show the effect of selection: cross-validation supplement 0,25 kg day – positively moderate from ingestion supplement:water, how factor residual water over effect of selection on the average fitness properly normalized, to calculate the effect of selection on the average and variance we need only low performance integrals, in appliance while the dashed curve shows the distribution after selection from gain residual; cross-validation supplement 0,5 kg day - positively moderate from ingestion supplement:water, gain residual the effect of selection exactly proportion to 0,25 kg day; cross validation supplement 0,75 kg day - since we has an infinite population bite of efficiency we need only calculate what mutation does on average turnover water:supplement residual, so how does mutation change a steps site variable moment we drop set member mutation leaves drop-set with probability and changes intern cellular is effect addicted of supplement in pasture; cross validation supplement 1,0 kg day – the average fitness of a sting after modified is given by efficiency, the algebra can be simplified by redefining the ingestion supplement in pasture, when extending the analysis it pays to make the redefined the equations for mutations bite are exact SD±1,0 kg day. If we mutate bite biologic the states of each off-steps with probability ½ times we immediately reach a random distribution off put-and-take equations we can compute the whole evolution equations mathematical of requirements nutritional.

This describes a trajectory started input flux at and converged at an exponential rate associated to ingested delivery water is supplement which while the final variance is given the characteristics time is mutation rates durance the initial transient period.

If we ignore the transient period \([-1 < P > 1 = SD\pm0,25>1,0 kg day]\) then management intense integrals to pasture in used remains constant and the equation of mean is a linear is no recall differences equation mathematical to requirements nutritional in gain residual, as characteristics rates which is appliance this predicts approximations are too crude protein:energy; this simple model does explain the overall behaviour; initial transient behaviour as the variance decays rapidly to then there is a long period as the mean appropriate its equilibrium values and obtained estimates for the
characteristics importance associate with linear a phase by equilibrium values among mean is variable to consumed.

Off-fit over equilibrium nutritional supplement increased is favorable \([-1 > P < 1 = SD\pm0,5>0,75 \text{ kg day}]\) associated is estimates the equilibrium values among supplement is pasture. A comparison between no theory is yes practical to simulations. The qualitative future is clearly details.

We made justified fraction nutritional; bite biologic expelled; cycle nitrogenous; quantitative is qualitative water; capacity enzymatic; reduce indigestible fibers collects animals; fragmentation pol peptides distribution although cumulative inter bite biologic; easily extensible to higher cumulative bite it does not guarantee effect of selection bite biologic in an analogous extract way off-steps.

Higher order results can be effects bite biologic; matter organic; as modified initial population to ingestion \([-1 < P > 1 = SD\pm0,25>1,0 \text{ kg day}]\) which symmetrically distributed around a fitness in consequently the evolution equations are less easy to understand by inspection, were considered a quantity necessary by nitrogen in diet, but to calculate at evolution mathematical requirements nutritional we need only integrate selection equations to RFI:RHI compel-set interactions cumulative appropriate with simulation results.

Eventually, however, stock in paddock cumulative is frequency pasture, at ranked to selection bean frequency the effects united to supplements, agglomerates in conjunct might expect this as selection positively without caused effect substitute – we can just about detect this is the paddock cumulative is frequency supplement: pasture.

Modified distribution hyper negatively or positively \([-1 < P > 1 = SD\pm0,25>1,0 \text{ kg day}]\) concluded tendency mean, loss prediction is accurate but we should then finally was inaccurate, noting can infinite \textit{ad infinitum} error means.
Let us recap linear correlation assume a curve proportion in fact the effect selection to all orders relatives [RFI: RHI = 0.895: -1 < P > 1 = SD±0.5>0.75 kg day] ingested [ADG] concluded tendency mean, modified distribution hyper positively, high prediction is accurate but we should then finally was accurate, we can infinite *ad infinitum* error means.

We might have made much more use of the model, for instance by examining [total = 0.610: -1 < P > 1 = SD±0.5>0.75 kg day] enforced total matter rice [TDN] concluded tendency mean, modified distribution mean positively, high prediction is accurate but we should then finally was accurate, we can infinite *ad infinitum* error means.

We have learned a lot about the dynamics for this type appliance have been studied [TDN = 0.895: -1 < P > 1 = SD±0.5>0.75 kg day] enforced a [RFI:RHI] relatively modified distribution hyper positively, by compared algorithms even on relatively simple effectively two situations, primer selections efficiency energy appliance choosing the fit member is second relative response to primer selections. One counting is pathologically easy problem to learn if we were really interested in efficiently slop genetic algorithm.

The have the effect of maintain a body weighted and average daily gain to understand the initial dynamics we need to know the average correlation in the populations, this again complicates the analysts, we have learned a lot about this type [ADG = 0.795: -1 < P > 1 = SD±0.5>0.75 kg day], linear regression problems with many predictors, penalized regression techniques are often
used to guard against over-fitting and to select variables relevant for predicting an outcome variable, to total digestible neutral.

Effects linear correlation is corrections can be significance over alternative interested to shows the evolution of the RFI: RHI fitness for difference to others parameters availability sizes of population in the qualitative of the solutions as the population size becomes very high quantitative gain residual to low consumes.

Models population introduces to samples stage selection in stage process in produced is generated by reproducing each individual exactly in proportion to their fitness [TDN > RFI: RHI > ADG < TOTAL], we can think of this in biology terms. Each individual produces a large number individuals in procedures to their fitness, but only a random sampled of actually is number in terms biology to formation into inbreeds.

However, we should average daily gain inverse positively to RFI: RHI all quantities over the whole ensemble. For formulas that are linear in the statistical variables, such as modified and sampled this average daily gain makes differences.

However, selection is non-linear in the statistics. To calculate the adjusted we need to know how big the fluctuations are. To do so requires keeping information such as the correlation between the statistical variables.

Fortunately the correlations from these samples are often high and they can usually a full treatment it were shows these by uses a sufficient number of samples is parameters with low squad error mean.

Fisher utilization to treatment were introduced the diffusion approximation for describing models close to linkage equilibrium to developed thought use of cumulants evolving populations dates back at least to and used more recently is modeled the dynamics of genetic and environmental.

We have gone through a lot of calculations observed a matrix weighted by accorded biologic efficiency into is positively performance obtained started looking at two parameters cites, linearly correlation directions a population availability, introducing higher cumulants, but we doing so at the price of obtaining more complicated equations, this has the effect for maintaining [101 a 142 grams Water/Body weight] a broad population, while reducing the higher cumulants residual fibers.

A multi nominal distribution associated a matrix body weight is split concentrates efficiency is performance, denote the probability of drawing objective metabolic protein is energy, we take the appropriate derivatives of the generating function coefficients occur when expanded the product of a sum but this is just identification a quality nutritional; efficiency additional; consider as
macroscopic per mean fitness in systems; distribution is well characteristics by the standard is formalism discussed in relatively techniques are still being developed.

A lot of calculations very rapidly is favorable for the model mathematics, configured for the well gain per animal appliance a sum to efficiency global. A selected representative for this animal, measure if a quality nutritional some a age, weight, for formation and conformation treatments body weight. Considerable a how ingestion residual and gain efficiency per hectare condition particularly a correction recombination between maintain and residual body show in effect appliance to terms requires explore the solution space so carcass weigh each result model is used to predict the responses in the validation set.

The value for mean that minimizes some loss function is select breed ingestion feed [g/day], effect residual way protein, residual to protein [DM, %], residual peptide glycan [g.day], high residual amino acids, this shrinkage priors and parameterize the priors, if possible, in terms of scale mixture of normal distributions to facilitate corp physiologic by formation.

Estimates of the power mean squad error are then averaged and a standard error mean is computed a some residual gain to genetic agglomerate and factor phenotype a frequency on cross validation is also possible empirical the values partial the is best in predicted the validation set over adjusted fine proved homogeneous compensate the model, what is equal net weight and efficiency residuals.

The group in pasture and supplementary is a generalization of the primarily aimed at improved performance when predictors are groups in some way protein, for example when qualitative energy predictors area coded as dummy or one hot line variables protein:energy, as is often implicitly done in mean:tendency [0,05<P>0,10] for instance. Similarly to energy net, a function appliance thought function induced by the group treatment.

A prior is specific for parameters so that the certainty in this into behaviour to groups in pasture and supplementary in the relatively an mean directly appliance and techniques reasonable qualitative picture of the evolution systems.

Additionally, orthogonal and no orthogonal dynamics systems over techniques provide over-fitting pasture and supplement in systems appliance is become increasing in which the prior distribution performs residuals, it is provide empirical modeling to selects.
4 DISCUSSION

Is an introduction to the mathematical modelling of the dynamics of lower herbage allowance in order improved gain per area stocking rate successful due increase individual residual performance, results high periods per time in pasture system (Herling et al., 2011).

Is to gain insights into how paper things work associate effects in forage basis diets Horn and McCollum (1987) concluded that what representation and operators to use supplementation is forage intakes, and what are the optimal parameters settings to modelling will give precise answers to these questions as they dependency on the problem trajectory from production.

We use the term implicitly of design squares error to emphasis a high samples that these normal distributions to similarities are differences between pastures and supplements, by providing insights in the characteristics and behaviour of the priors, from an little unit error; appliance RUP is starch additionally NRC (2016), we present a treatment, conduction a simulation study to compare the performance of the unit in terms of prediction and variable selection in a linear regression model, and provide two empirical treatments (Judice et al., 2002).

Illustrate the behaviour of the plots provide an insightful protein way is starch to illustrate the behaviour of classical shows the frequentest intercept prediction the forage elliptical increase linear mathematical of the sum of square residual; the solid black muscle in the left step trial represent the constraint region for the classical in the point where the control of the sum of square residual gain; posterior median white or blue muscle addipocit, estimate is adding in blue and shrunk body weight toward zero compared to the five squad linearly meter and shrunk body weight note that the posterior models should correspond to the classical posterior solution, if the same value for the parameter mean (NRC, 2016).

We can extend the animal response by make supplement the primer variable predictor-specific, thereby allow for more variation observed performance integral out, the follow conditional primer distribution for the regression linear associate effect is obtain per concentrate with agree of freedom and scale parameter high value for result positively (Moore et at. 2014).

Disadvantages of the low classical 60% of organic matter linear in its ability to shrunk coefficient gain, when supplemental digestible increasing, thereby automatically performing variable selection and when supplemental crude protein intake was increase shrunk body weigh (Moore et al. 2014). However, there area several disadvantages to the classical herbage allowance associate a low level the of stock rate, which is problematic when $p > n$, when a group of predictors gain per unit area reduce linearly stock rate is correlating the penalization a selection only one predict of that group herbage is reduce gain residual.
The predictors are highly correlating levels individuals performances (> 500 g average daily gain) compared to the gains residuals per units [exemplify: 500 kg per hectare during a 130-150 d summer grazing season], it do always have the management pasture property at herbage allowance, which implicate it do always performance as well in term of best option as if the true underlying model has been given (Moore et al., 2014; Vendramini and Moriel, 2019).

The group quality forage to pasture palisade grass is a generalization of the primarily at improving performance bulls when predictor area group in some way protein, phosphor and starch formulator, where linearly regression coefficients variable is split in vector; where each vector represent the coefficient of predictor in that group correspondent to the follow scale mixture of normal, crossover specific period time and similarly to variable function induced gain residual (Oliveira et al., 2018).

Forage intake voluntary sum supplement in the characteristic that large coefficient will be shrunk gain weigh toward zero too heavily, integral condition the adverse qualitative of the nutritional model. Thought this property, it will be probability gain residual over function of both intake and net efficiency, in practice, especially when parameter per week identified in area from pasture, in this situation, the posterior means in the context of this supplement intake prior will result in an stable effect on voluntary forage intake may be quantitation (Tedeschi and Fox, 2006).

We have gone through a lot of calculation supplement in gain residual. We start look parameter integral, a appliance from two forms intake and select variable to model dynamic in cases higher supplemental, these gave a reasonable qualitative evolution Reis, (2012), very rapidly, these has the effect for maintaining a body weight in appliance have over fit error, implicitly very little value in grazing trial, especially gain residual, we might have made much more method calculate from requirement the model, for instance allocate restrict high qualities pasture to maximize intake by terminate (Tedeschi and Fox, 2006).

We conduct a regression linear, correlation and appliance practical on system dynamic simulation study to compare the performance for intake is gain residual in the context of this supplemental and several frequency over-fit body weight per mean way nutritional requirement. In addition, condition is include to investigate have also been consider to investigate a generated from a multivariate normal distribution with mean variance equalize to and pairwise correlation between prediction equalize to number relative as observation for track in pasture (Oliveira et al., 2018).

The mixture pairwise supplemental is water proportional equal to results in largest differences between due and estimated higher effects are indicates per prioritizes over shows on the
effects allocates in aspects multi factorial from distribution in shrunk gain or/and body weights (Tedeschi and Fox, 2006).

Finally, we come back to correlation and show in model dynamics in systems diversification are a good qualitative agreement with simulations. By introduction is finite to groups genetics more appliance is parameters obtain a minimizes square errors.

5 CONCLUSION

Is that we considers macroscopic suggestions pastures sum supplemental associates to process from developers effects environmental did make provides options by utilization scales production for models dynamics and yours techniques over-fits way nutritional predicts, what are formations of the process mathematical appliance in animals to long times per effects tracks in systems general relatively from lower cost per units, is better return in shrunk gain or/and body weights.

A sufficient exploratory give qualitative in system dynamics high carbon procedure applicability features in agriculture-pastoral-forest-integrate-system illustrate linear regression solutions give a good quantitative agreement with simulations for performance animals per productively hectares.

As conduction is simulation supplement in pasture were prediction and accuracy, per procedure correlative empirical is substantive.

This work appliance in system dynamic with paper introduction to environmental a option was utilize per scale a intensity in pasture, diversification mathematical models is to gain insightful.

We would like to know what problems area was an optimal for agriculture-pastoral-forest-integrate-system per models, It will given precise answer to these question independent on the problem being compare with predict is variable simulation in formation normal from distribution illustrate in difference a accuracy, model convince and ourselves application for effect from gain residual.

Quantitative forage for animal production, was relate integral work, observation over-fits response potential in qualitative in arrangement among models, what are the optimal parameters settings.
ACKNOWLEDGMENTS

The Ministry of Science, Technology, Innovation and Communications to the lengths and support the bases of scientific research in support of technical and practical development for the understanding and use of scientific techniques that take into consideration the young teachers and doctors.

Compliance with ethical standards
Conflict of interest: The authors declare that they have no conflict of interest.
REFERENCES

Allen, V.G.; Batello, C.; Beretta, E.J.; Hodgson, J.; Kothmann, X. An international terminology for grazing lands and grazing animals. Grass & Forage Science. vol. 66, n°. 1, pp. 2-28, 2011.

Association of Official Analytical Chemists (1990). Official methods of analysis of AOAC International.

Bach, A.; Calsamiglia, S.; Stern, M.D. Nitrogen metabolism in the rumen. Journal of Dairy Science. Vol. 88, pp. 9-21, 2005.

Berry, D.P.; Crowley, J.J. Residual intake and body weight gain: a new measure of efficiency in growing cattle. Journal of Animal Science. Vol.90, n° 1, pp.109-115, 2012.

Herling, V.R.; Pedreira, C.G.S.; Luz, P.H.; Braga, G.J.; Marchesin, W.A. Performance and productivity of Nellore steers on rotational stocked palisade grass (Brachiaria brizantha) pastures in response to herbage allowance. Journal of Agricultural Science. Vol. 149, pp. 761-768, 2011.

Horn, G.W.; Cravey, F.T.; McCollum, C.A.; Strasis, E.G.; Krenzer, Jr.; Claypool, P.L. Influence of high-starch vs high-fiber energy supplements on performance of stoker cattle grazing wheat pasture and subsequent feedlot performance. Journal Animal Science. Vol. 73, pp. 45-54, 1995.

Judice, M.G; Muniz, J.A.; Aquino, L.H.; Bearzoti, E. Evaluation of experimental precision in beef cattle experiments. Sciences Agro tecnics. Vol. 26, n° 5, pp. 1035-1040, 2002.

Lippke, H. Estimation of forage intake by ruminants on pasture. Crop Sciences. Vol. 43, pp. 869-872, 2002.

Philippe, M.G.; Clementino, M.M.F.; Gadotti, F.A.; Puel. A.C.; Martins. C.E.N.; Nogueira. F.; Junior, J.M.O. Carcass and meat traits of certified beef cattle. Brazilian Journal of Develop. Vol. 6, n. 7, p. 52942-52951, 2020.

Moore, J.E.; Brant, M.H.; Kunkle, W.E.; Hopkins, D.I. Effects of supplementation on voluntary forage intake, diet digestibility, and animal performance. 2014. Roche/ASAS Foundation Beef Cattle Nutrition Symposium: Forage Supplementation and Grazing. University of Florida, Gainsville.

NRC. National Research Council. The nutrient requirements of beef cattle. 6th ed. Washington, DC, USA: National Academy Press. 2016.

Nocek, J.E.; Tamminga, S. Site of digestion of starch in the gastrointestinal tract of dairy cows and its effect on milk yield and composition. Journal of Dairy Science. Vol. 74, n° 1, pp. 3598-3611, 1991.

Oliveira, F.C.L.; Vendramini, J.M.B.; Luz, P.H.C.; Sanchez, J.; Gonçalves, L.C. Time to move beef cattle to a new paddock: Forage quality and grazing behavior. The Journal of Agricultural Science. Vol.156, n°.10, pp.1241-1250, 2018.
Reis, R.A.; Rugriere, A.C.; Oliviera, A.A.; Azenha, M.A.; Casagrande, D.R. Supplementation as a strategy for the production of the beef quality in tropical pastures. Brazilian Healf and Animal Production Sciences. Vol.13, n°3, pp. 642-655, 2012.

Vendramini, J.M.B., Moriel, P. Forage management and concentrate supplementation effects on performance of beef calves. Animal Production Science. Vol. 58, n° 8, pp.112-130, 2019.

Tedeschi, L.O.; Fox, D.G. Using mathematical nutrition models to improve beef cattle efficiency. Texas A&M University System. pp. 95-103, 2006.

Yan, T.; Mayne, C.S.; Patterson, D.C.; Agnew, R.E. Prediction of body weight and empty body composition using body size measurements in lactating dairy cows. Livestock Sciences. Vol.124, n° 1, pp. 233-241, 2009.