Información suplementaria

Desarrollo de un modelo dinámico mecanicista para predecir el crecimiento en cuyes (*Cavia porcellus*) machos del genotipo Perú

Development of a mechanistic dynamic model to predict growth in male guinea pigs (*Cavia porcellus*) of the Peru genotype

William Armando Tapie, Sandra Lucia Posada-Ochoa,

Jaime Ricardo Rosero-Noguera, Rafael Muñoz-Tamayo

Autor de correspondencia: *Rafael.Munoz-Tamayo@inrae.fr*

Código Siblab

```
disp('%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%');

disp('Warning: the units must be double checked');
disp('%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%');

clear // clear all the variables

st = 1; // step time. d
tf = 84;// final time. d
t = 0:st:tf;  // time of the simulation
t =t';// transposing the vector as column vector
PC_A = 0.1635; //proteína del alimento
EB_A  = 4515; // EB aliment Kcal/KgMS
EM_EB = 0.78;//Metabolicidad del alimento

CMS = [33.8 33.4 36.5 36.8 35.6 38.9 37.3 40.6 38.8 43.0 41.7 43.7 41.6 39.9 45.5 47.2 44.8 45.2 42.6 45.4 44.1 45.1
46.2 45.1 44.1 45.9 46.8 47.1 41.7 45.9 44.9 44.8 45.1 44.4 42.6 44.8 42.8 43.6 45.9 49.2 47.4 48.8 48.7 51.8 51.3
50.6 52.0 50.8 47.6 54.0 47.8 51.3 49.7 52.5 51.9 50.7 53.9 49.0 49.5 51.0 54.4 52.3 52.9 50.9 52.1 52.8 52.3 53.3
53.7 50.2 57.4 57.6 59.1 58.5 57.7 57.6 56.1 54.9 55.4 56.6 57.9 55.2 57.4 57.3];//g/d consumo de alimento (MS)

PV0 = 0.394; //kg peso vivo inicial promedio
PCV0 = 0.8221*PV0; /peso corporal vacío inicial
PV(1)  = PV0;
PCV(1) = PCV0;
PC(1)  = 0.2056*PCV(1); // proteína inicial.kg
G(1)   = 0.00784*PCV(1); // grasa inicial. kg
Agua(1)  = 0.7171*PCV(1); // agua inicial. kg
CZ(1)   = 0.054*PCV(1); // cenizas inicial.kg

PC_max = 4; // valor máximo de proteína depositada 4 g/d

for k=2:length(t);
CPC(k)   = CMS(k)*PC_A; // Consumo de proteína g/d
CEM(k)    = (CMS(k)*EB_A/1000)*EM_EB; // Kcal/d_ consumo de EM
EM_m(k)   = 149*(PCV(k-1))^0.75; // Energy for maintenance kcal/kgPCV/dia
PC_m(k)   = 6.32*(PCV(k-1))^0.75; // Protein for maintenance g/Kg PCV/d

EM_g(k)   = CEM(k) - EM_m(k);         // Energy for growth Kcal/d
PC_g(k)   = CPC(k) - PC_m(k);         // Protein for growth g/d

PC_pot(k)  = min(0.629*PC_g(k),PC_max);     // protein deposition rate, g/d

EM_PCpot(k) = 13.571*PC_pot(k)- 3E-13; //R² = 0,999// kcal/g de PC depositada

EM_GD(k)   = EM_g(k) - EM_PCpot(k); // Energy for fat deposition (kcal/d)
G_pot(k) = (EM_GD(k))/13.478; // grasa depositada (g/d) kcal/g energía /g de grasa depositado
PC(k)      = PC(k-1) + PC_pot(k)/1000;     // PC en PCV kg/
G(k)       = G(k-1) + G_pot(k)/1000;       //  grasa en PCV kg
Agua(k)    = 3.2577*PC(k)+ 0.0165;//R² = 0,8513
CZ(k)      = 0.2293*PC(k) + 0.003; //R² = 0:8559

PCV(k)   = PC(k) + G(k) + Agua(k) + CZ(k);    // Empty Body Weight kg
PV(k)    = 1.05*PCV(k);// teniendo en cuenta PCV/PV=0.948
 end
figure
subplot(121),plot(t,PC,'b');
plot(t,G,'r');
plot(t,Agua,'k');
plot(t,CZ,'m');
```

```matlab
xlabel('Time (d)');
ylabel('Body weights, kg');
legend('PC','G','Agua','CZ');
subplot(122),plot(t,PCV);
xlabel('Time (d)');
ylabel('PCV, kg');
```