ANEXO II: PERFILES DE VELOCIDAD A LA ENTRADA Y PRESIÓN A LA SALIDA DEL AAA

En este anexo se expone el código necesario introducir en la simulación mediante elementos finitos en Ansys para definir el perfil de velocidades a la entrada del saco aneurismático y el perfil de presiones a la salida saco del aneurisma.

Código introducido en Ansys:

```
/*****************************************************************
*****

unsteady.c

UDF for specifying a transient velocity and pressure profile boundary condition

*****************************************************************
******/

#include "udf.h"

#define d0 0.177568627 /* constants */

#define d1 -0.012938694

#define d2 0.009067192

#define d3 -0.005234681

#define d4 0.00224451

#define d5 -0.000478664

#define d6 -0.000444472

#define d7 0.000635242

#define d8 -0.000532567

#define d9 0.000160674

#define d10 0.000160674

#define d11 -0.000171414

#define d12 -4.57744E-06

#define d13 7.00237E-05

#define d14 -0.00015864

#define d15 1.07395E-05

#define d16 -2.75919E-06

#define e1 -0.008108602

#define e2 0.000496195

#define e3 0.002932808

#define e4 -0.003010277
```

```
#define e5 0.001105721
#define e6 0.000270161
#define e7 -0.001060228
#define e8 0.000754177
#define e9 -0.000331211
#define e10 -9.43584E-05
#define e11 0.00014482
#define e12 -0.000188162
#define e13 6.85602E-05
#define e14 2.41615E-05
#define e15 -0.000217158
#define e16 0.000267113
#define a0 0.16807843
#define a1 -0.08814363
#define a2 0.00487054
#define a3 0.03940532
#define a4 -0.04100545
#define a5 0.01909621
#define a6 -0.00358623
#define a7 0.00144674
#define a8 -0.00131554
#define a9 -0.00065469
#define a10 -0.00065469
#define a11 -0.00273721
#define a12 0.00193043
#define a13 -0.00017805
#define a14 -0.00154871
#define a15 0.00022379
#define a16 0.00084621
#define b1 0.08858568
#define b2 -0.12020702
#define b3 0.0762913
#define b4 -0.01830361
```

```
#define b5 -0.00719311
#define b6 0.01048668
#define b7 -0.00779611
#define b8 0.00413867
#define b9 -0.00107449
#define b10 -0.00133198
#define b11 0.00115922
#define b12 -0.00253661
#define b13 0.00284333
#define b14 -0.00142997
#define b15 0.0012912
#define b16 -0.00196964
#define Per 1
#define pi 3.1415926535
/* profile for velocity */
DEFINE_PROFILE(unsteady_v, t, pos)
{
face_t f;
real time, velocity, x[ND_ND], r, k, l;
real D0, A0, G1, s;
real H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16;
begin_f_loop(f, t)
{
time = RP_Get_Real("flow-time");
D0 = d0/2;
A0 = a0/2;
H1 = a1*cos((1*2*pi*time)/Per) + b1*sin((1*2*pi*time)/Per);
H2 = a2*cos((2*2*pi*time)/Per) + b2*sin((2*2*pi*time)/Per);
H3 = a3*cos((3*2*pi*time)/Per) + b3*sin((3*2*pi*time)/Per);
H4 = a4*cos((4*2*pi*time)/Per) + b4*sin((4*2*pi*time)/Per);
H5 = a5*cos((5*2*pi*time)/Per) + b5*sin((5*2*pi*time)/Per);
H6 = a6*cos((6*2*pi*time)/Per) + b6*sin((6*2*pi*time)/Per);
H7 = a7*cos((7*2*pi*time)/Per) + b7*sin((7*2*pi*time)/Per);
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H8 = a8*cos((8*2*pi*time)/Per) + b8*sin((8*2*pi*time)/Per);
H9 = a9*cos((9*2*pi*time)/Per) + b9*sin((9*2*pi*time)/Per);
H10 = a10*cos((10*2*pi*time)/Per) + b10*sin((10*2*pi*time)/Per);
H11 = a11*cos((11*2*pi*time)/Per) + b11*sin((11*2*pi*time)/Per);
H12 = a12*cos((12*2*pi*time)/Per) + b12*sin((12*2*pi*time)/Per);
H13 = a13*cos((13*2*pi*time)/Per) + b13*sin((13*2*pi*time)/Per);
H14 = a14*cos((14*2*pi*time)/Per) + b14*sin((14*2*pi*time)/Per);
H15 = a15*cos((15*2*pi*time)/Per) + b15*sin((15*2*pi*time)/Per);
H16 = a16*cos((16*2*pi*time)/Per) + b16*sin((16*2*pi*time)/Per);
G1 = H1+H2+H3+H4+H5+H6+H7+H8+H9+H10+H11+H12+H13+H14+H15+H16;
s = A0+G1;
F_CENTROID(x,f,t);
r = x[1];
/*S = 2*s*((1-((2*r)/D0)^2))*/
l = 2*r/D0;
k = 1-l*l;
velocity = 2*s*k;
F_PROFILE(f, t, pos) = velocity;
}
end_f_loop(f, t)
}
/* profile for pressure */
DEFINE_PROFILE(unsteady_P, t, pos)
{
face_t f;
real time, D0, N1, Pr, J;
real M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12, M13, M14, M15, M16;
begin_f_loop(f, t)
{
time = RP_Get_Real("flow-time");
D0 = d0/2;
M1 = d1*cos((1*2*pi*time)/Per) + e1*sin((1*2*pi*time)/Per);
M2 = d2*cos((2*2*pi*time)/Per) + e2*sin((2*2*pi*time)/Per);
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```
M3 = d3*cos((3*2*pi*time)/Per) + e3*sin((3*2*pi*time)/Per);
M4 = d4*cos((4*2*pi*time)/Per) + e4*sin((4*2*pi*time)/Per);
M5 = d5*cos((5*2*pi*time)/Per) + e5*sin((5*2*pi*time)/Per);
M6 = d6*cos((6*2*pi*time)/Per) + e6*sin((6*2*pi*time)/Per);
M7 = d7*cos((7*2*pi*time)/Per) + e7*sin((7*2*pi*time)/Per);
M8 = d8*cos((8*2*pi*time)/Per) + e8*sin((8*2*pi*time)/Per);
M9 = d9*cos((9*2*pi*time)/Per) + e9*sin((9*2*pi*time)/Per);
M10 = d10*cos((10*2*pi*time)/Per) + e10*sin((10*2*pi*time)/Per);
M11 = d11*cos((11*2*pi*time)/Per) + e11*sin((11*2*pi*time)/Per);
M12 = d12*cos((12*2*pi*time)/Per) + e12*sin((12*2*pi*time)/Per);
M13 = d13*cos((13*2*pi*time)/Per) + e13*sin((13*2*pi*time)/Per);
M14 = d14*cos((14*2*pi*time)/Per) + e14*sin((14*2*pi*time)/Per);
M15 = d15*cos((15*2*pi*time)/Per) + e15*sin((15*2*pi*time)/Per);
M16 = d16*cos((16*2*pi*time)/Per) + e16*sin((16*2*pi*time)/Per);
N1 = M1+M2+M3+M4+M5+M6+M7+M8+M9+M10+M11+M12+M13+M14+M15+M16;
Pr = D0+N1;
J = 133416;
F_PROFILE(f, t, pos) = Pr*J;
}
end_f_loop(f, t)
}
```