

NUMERICAL RESULTS

Model of knee joint

- quasi-static problem
- matching mesh
- modified Uzawa algorithm with PCGM

Material parameters (Young's modulus E , Poisson's ratio ν)

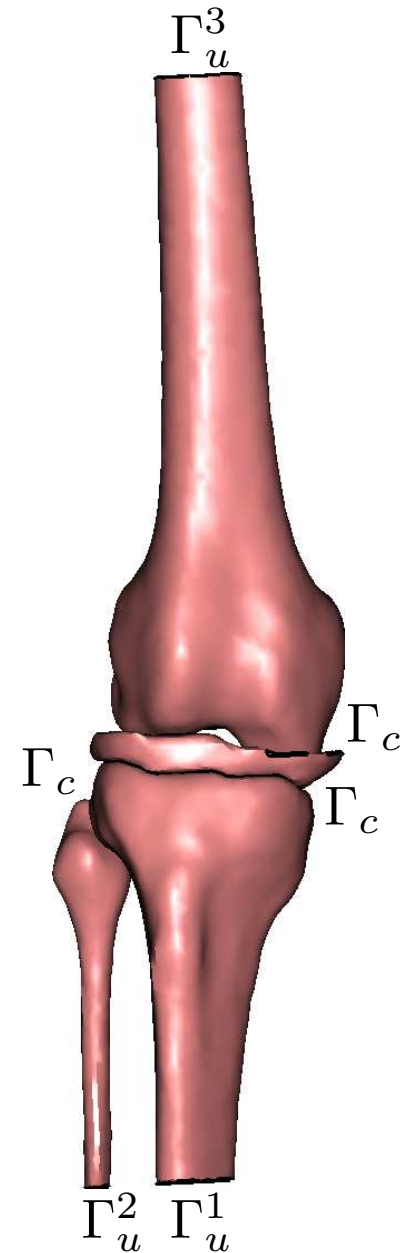
- bone: $E = 1.71 \times 10^{10}$ [Pa], $\nu = 0.25$
- meniscus: $E = 4.92 \times 10^8$ [Pa], $\nu = 0.1$

Discretization parameters

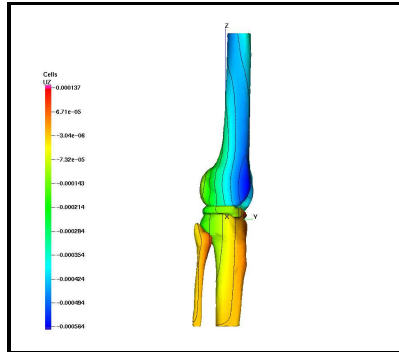
- number of nodes ... 14828
- number of elements (tetrahedral) ... 60629

Boundary conditions

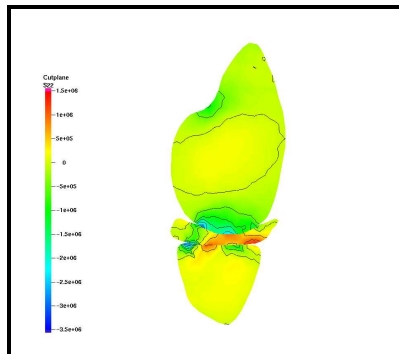
- the tibia and the fibula are fixed on Γ_u^1 and Γ_u^2
- for the femur is prescribed displacement -0.5 mm on Γ_u^3
in direction of femur axis for dorso-anterior deviation $\pm 2^\circ$



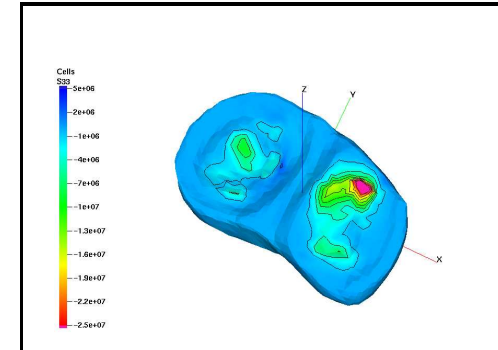
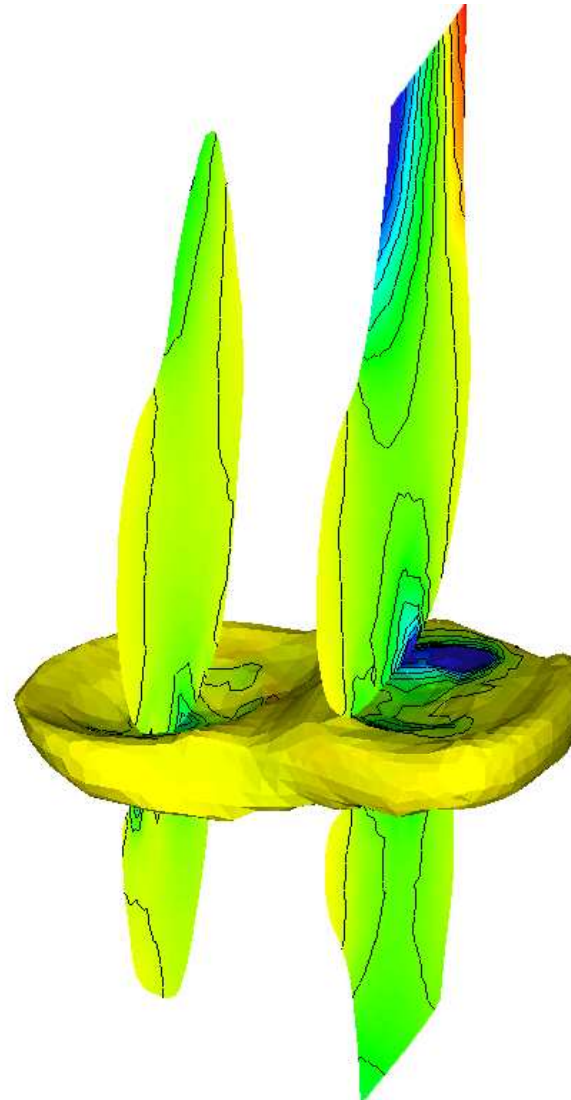
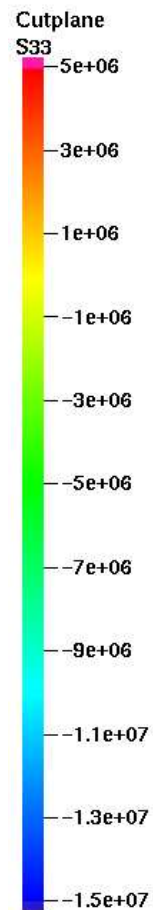
NUMERICAL RESULTS



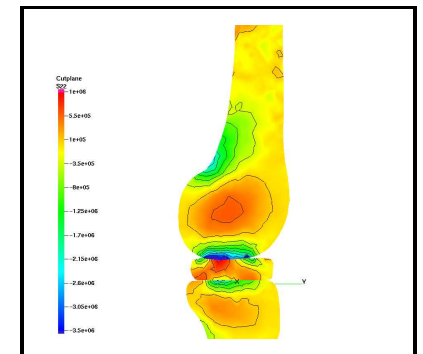
vertical displacement
on surface



components of stress
tensor τ_{yy} and τ_{zz}



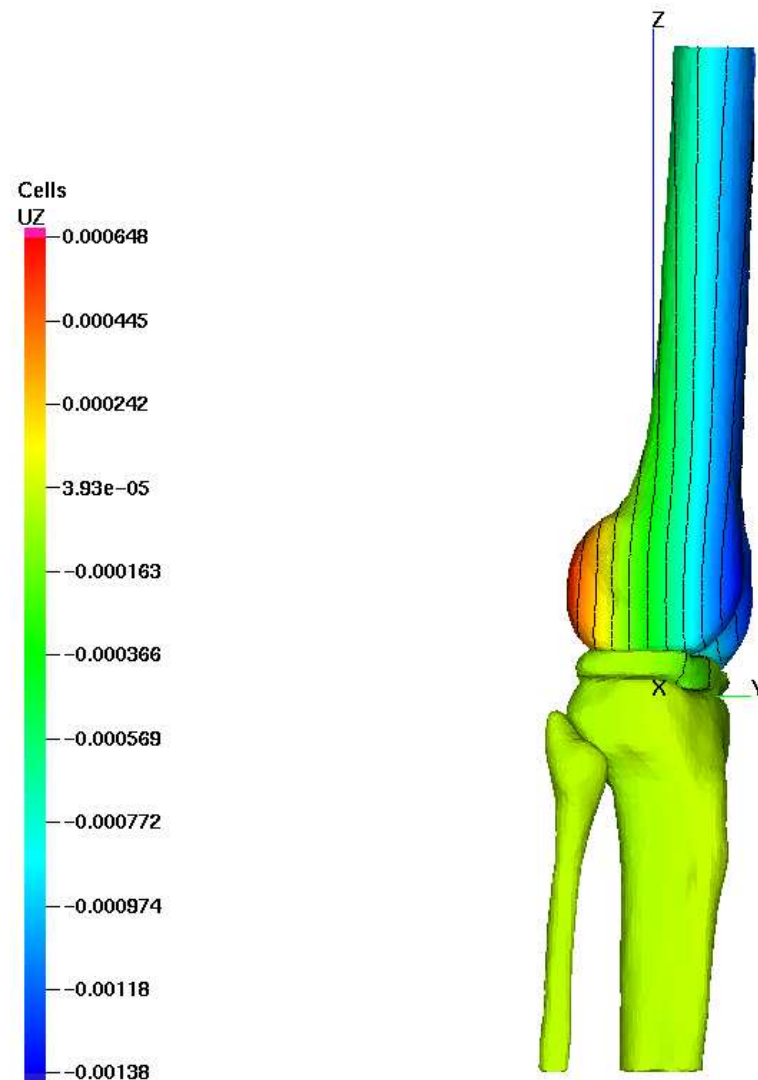
component τ_{zz} of stress
tensor on surface



components of stress
tensor τ_{yy} and τ_{zz}

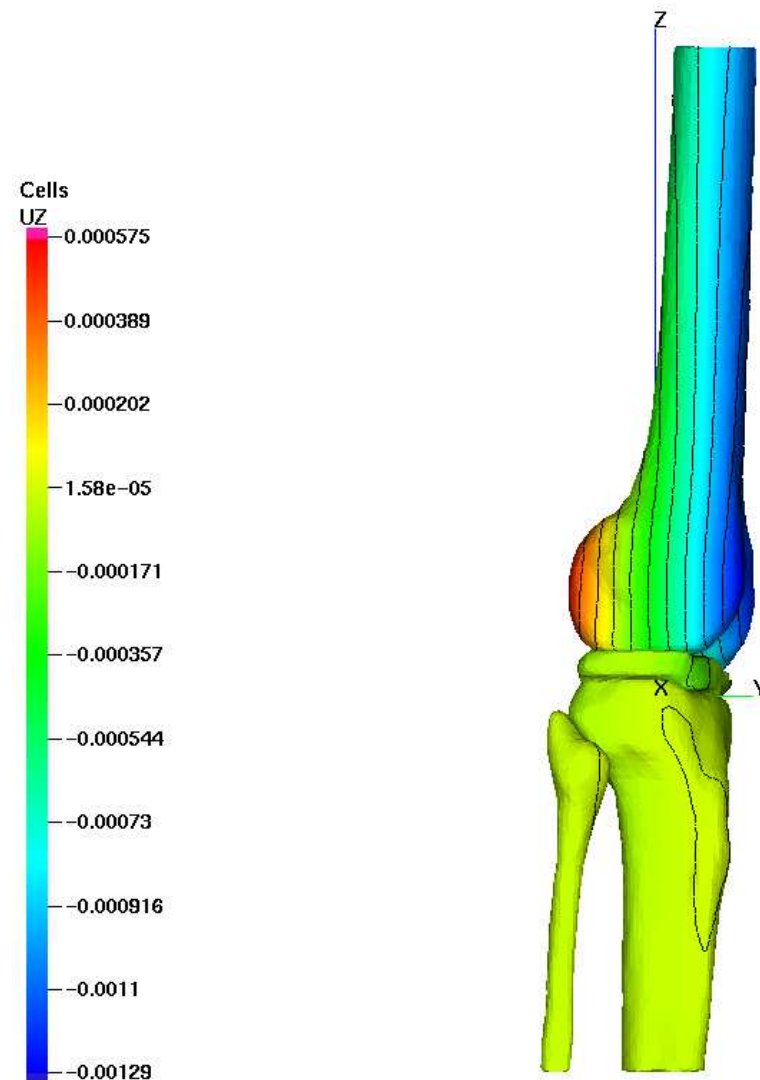
MODEL OF KNEE JOINT

vertical displacement



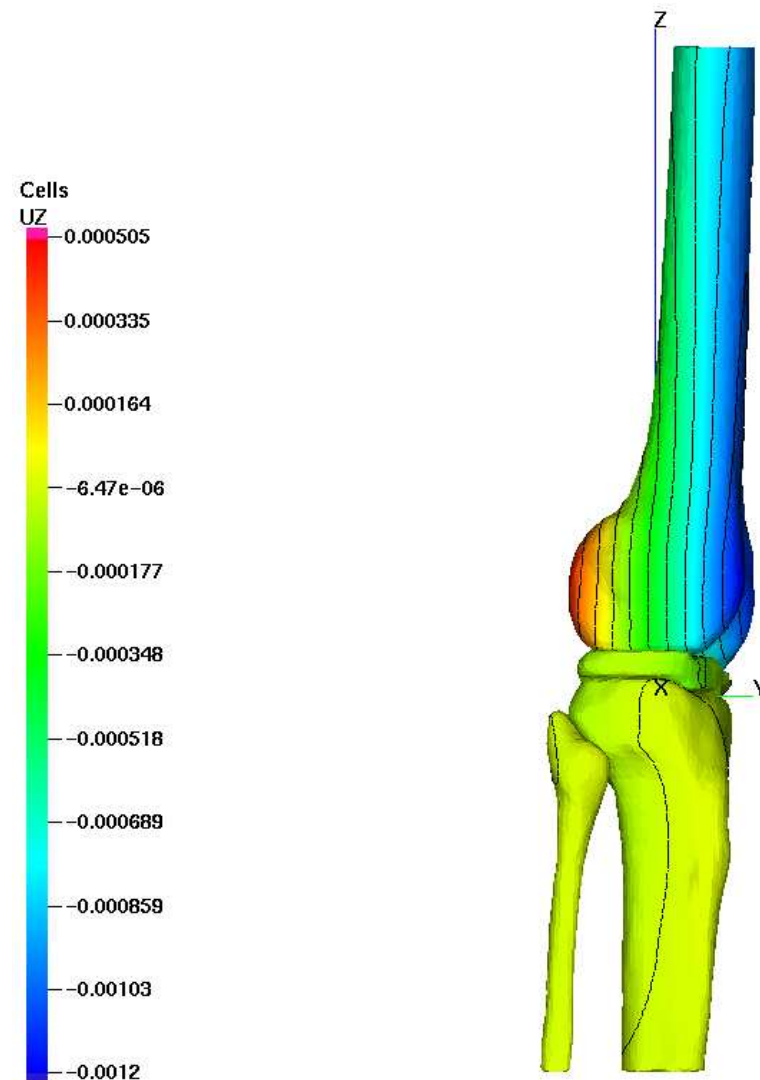
MODEL OF KNEE JOINT

vertical displacement



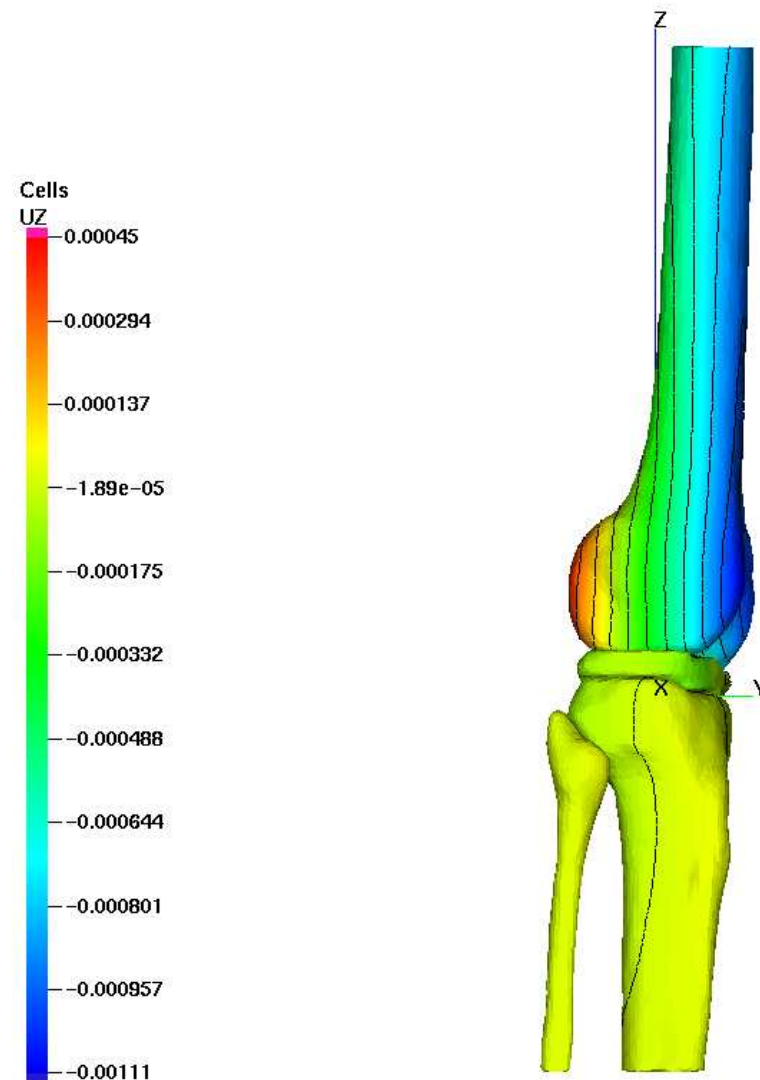
MODEL OF KNEE JOINT

vertical displacement



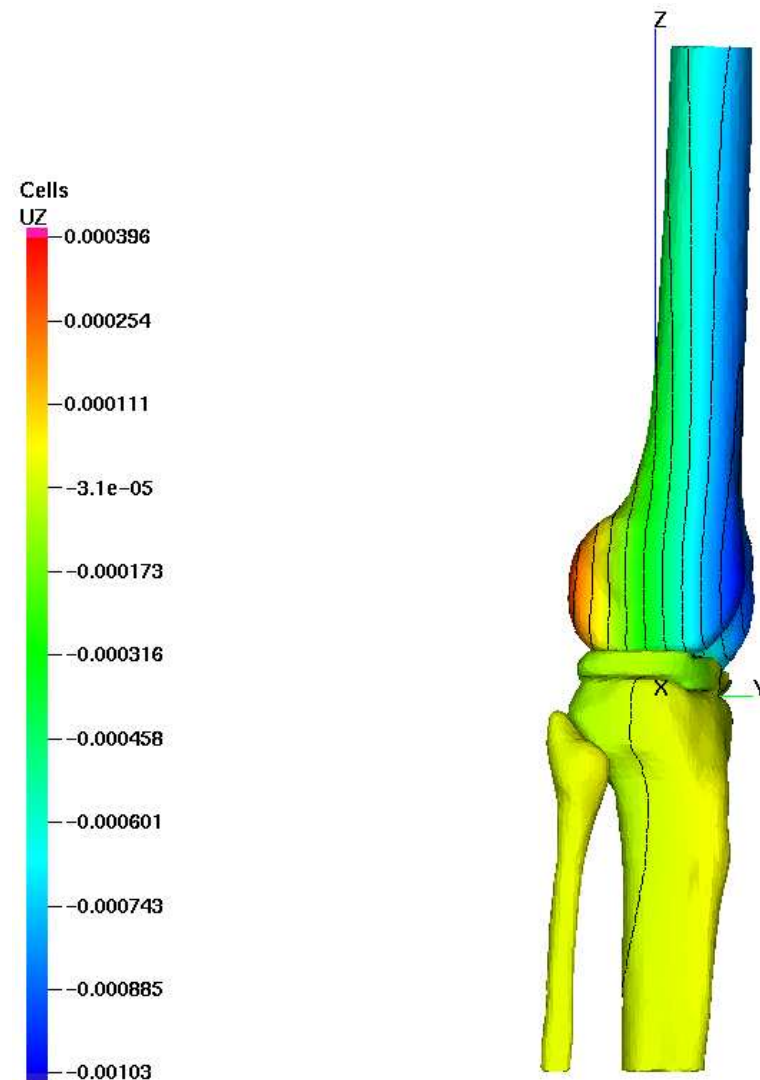
MODEL OF KNEE JOINT

vertical displacement



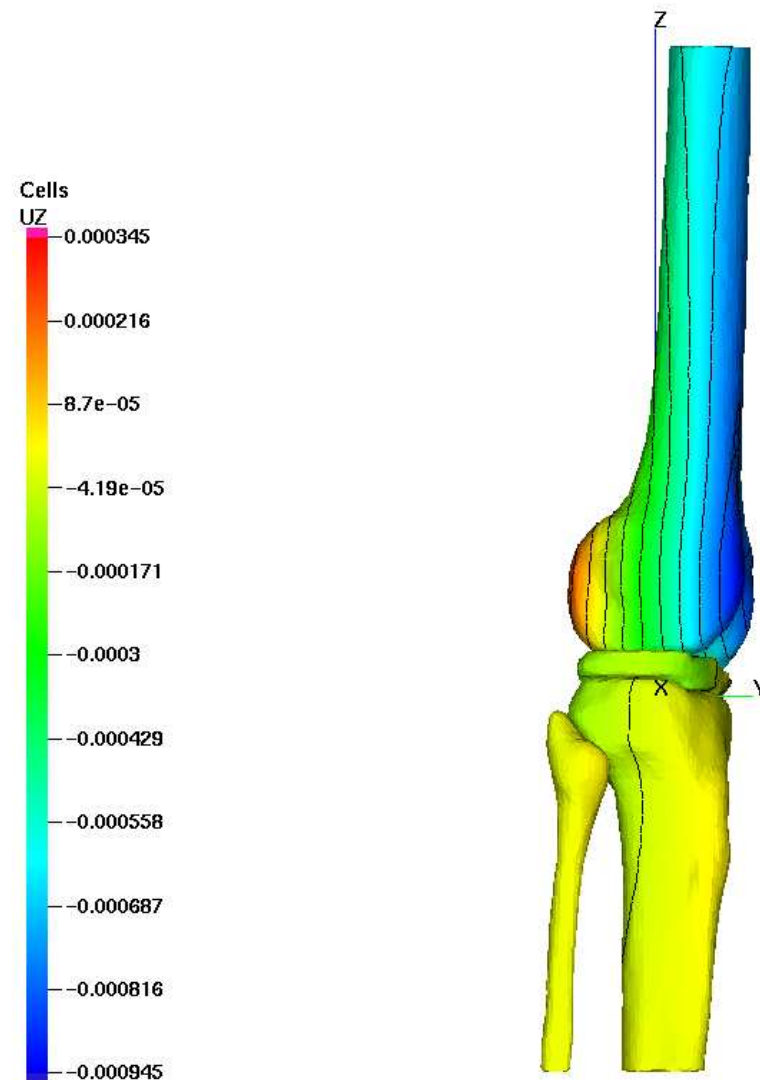
MODEL OF KNEE JOINT

vertical displacement



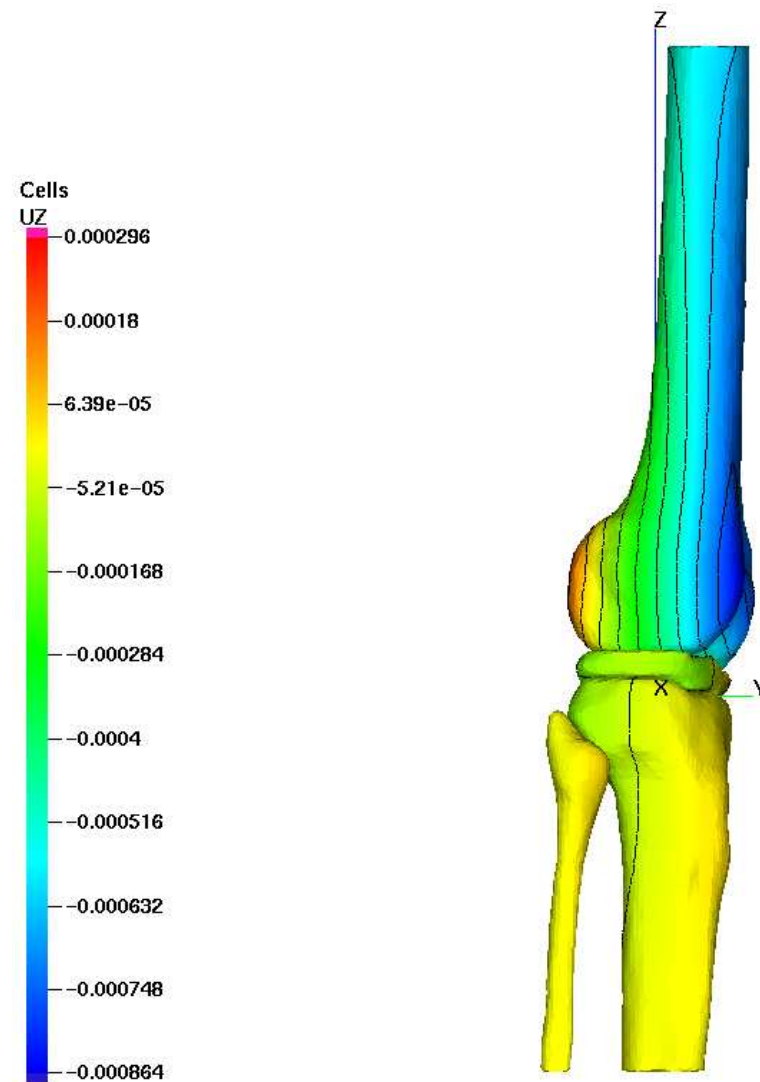
MODEL OF KNEE JOINT

vertical displacement



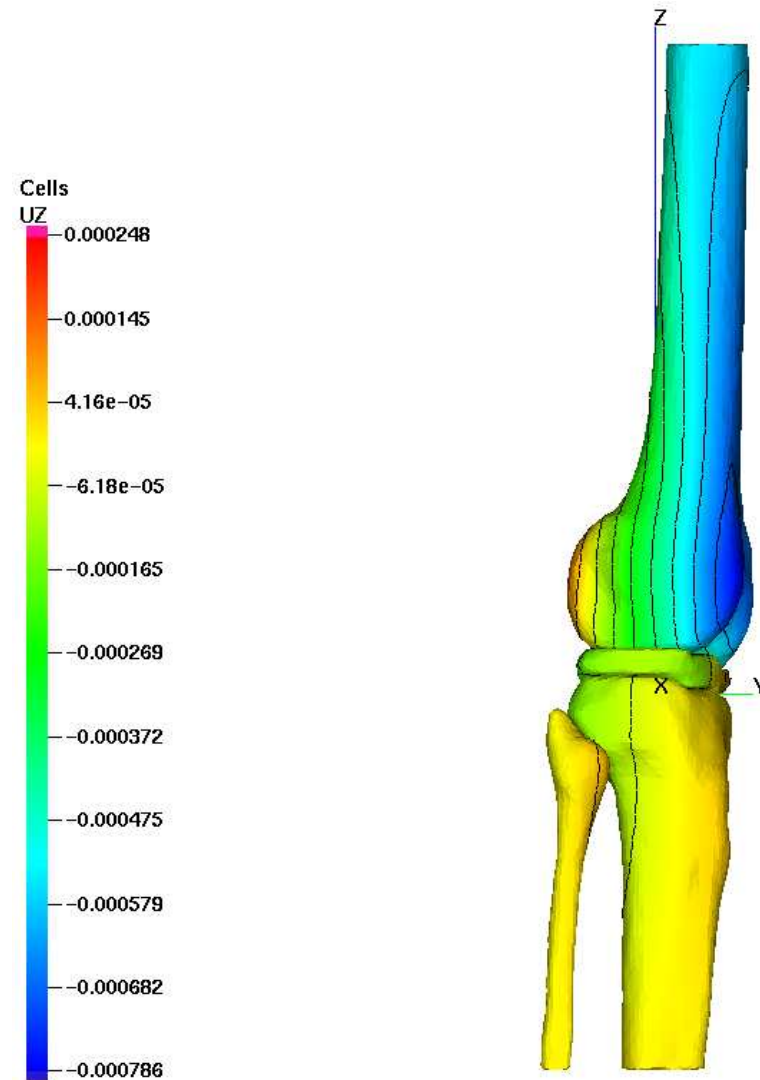
MODEL OF KNEE JOINT

vertical displacement



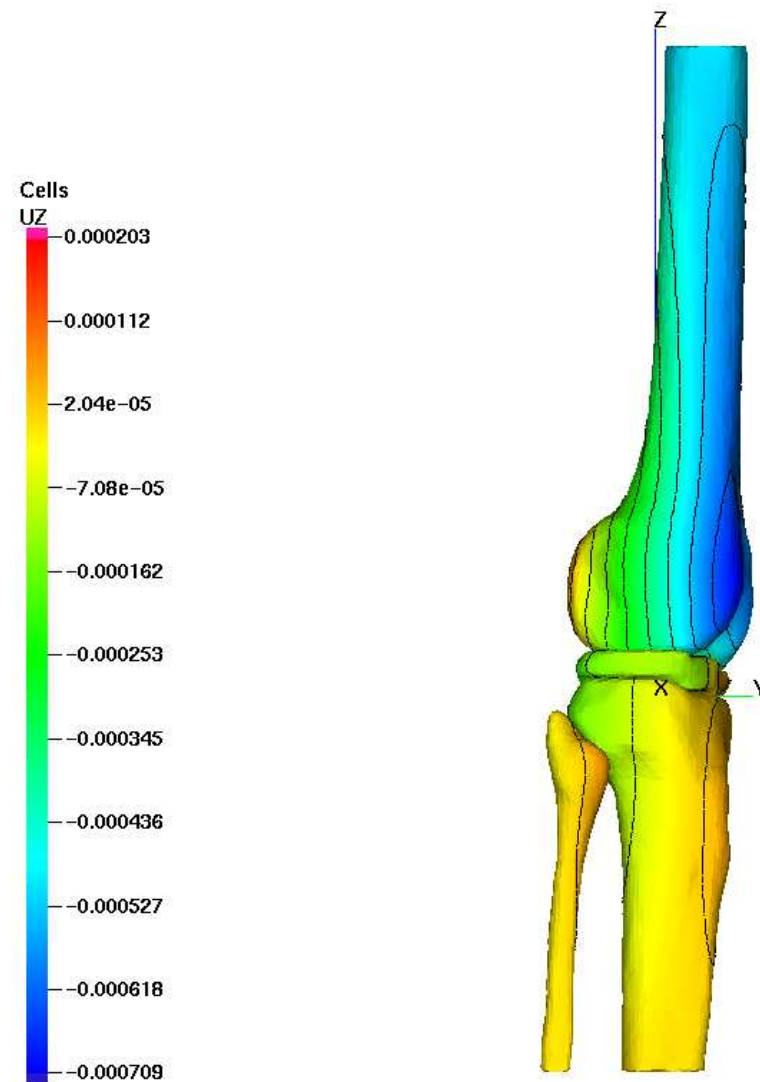
MODEL OF KNEE JOINT

vertical displacement



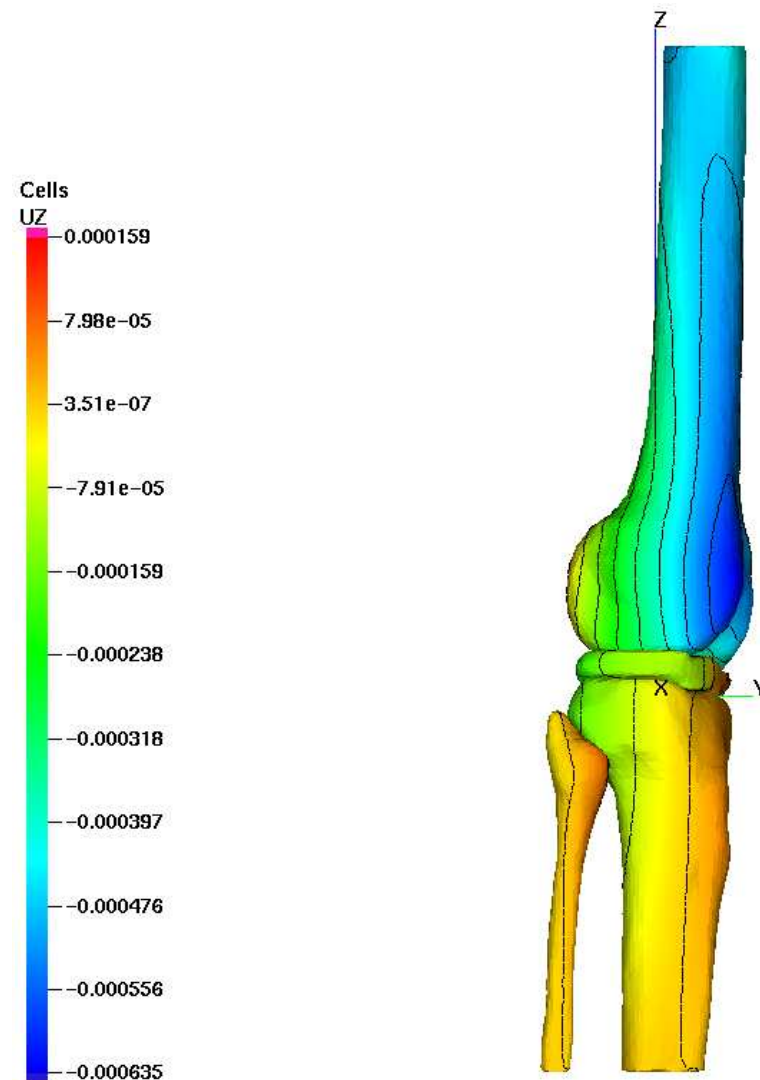
MODEL OF KNEE JOINT

vertical displacement



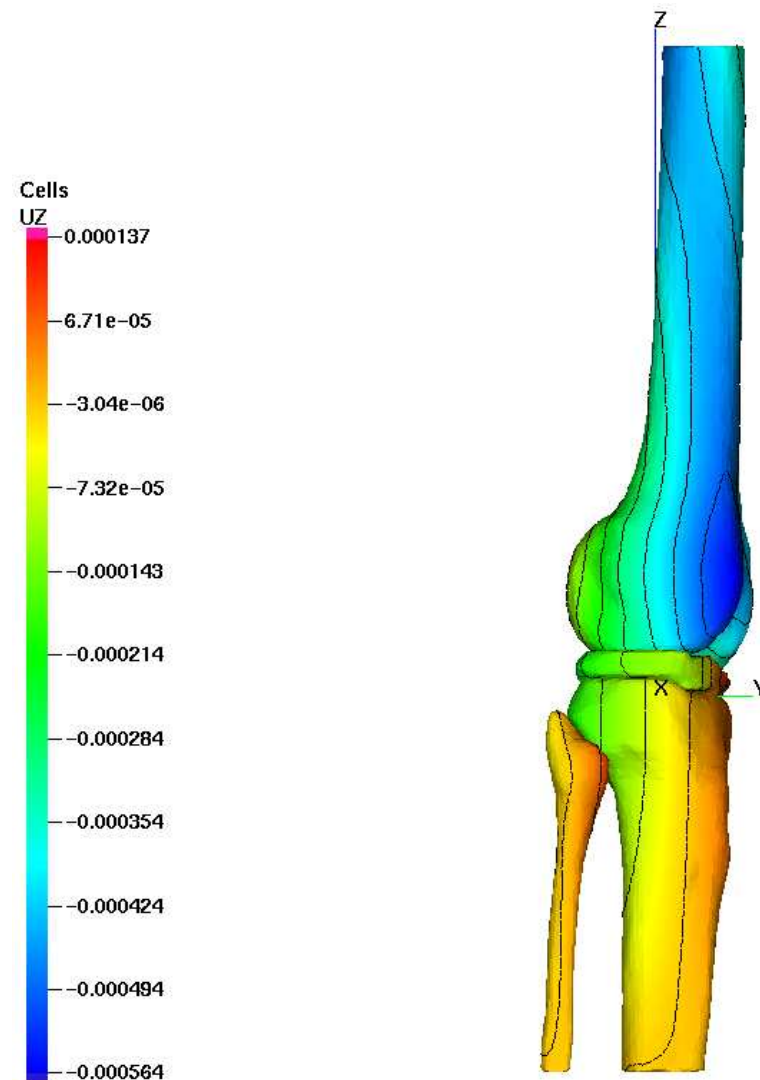
MODEL OF KNEE JOINT

vertical displacement



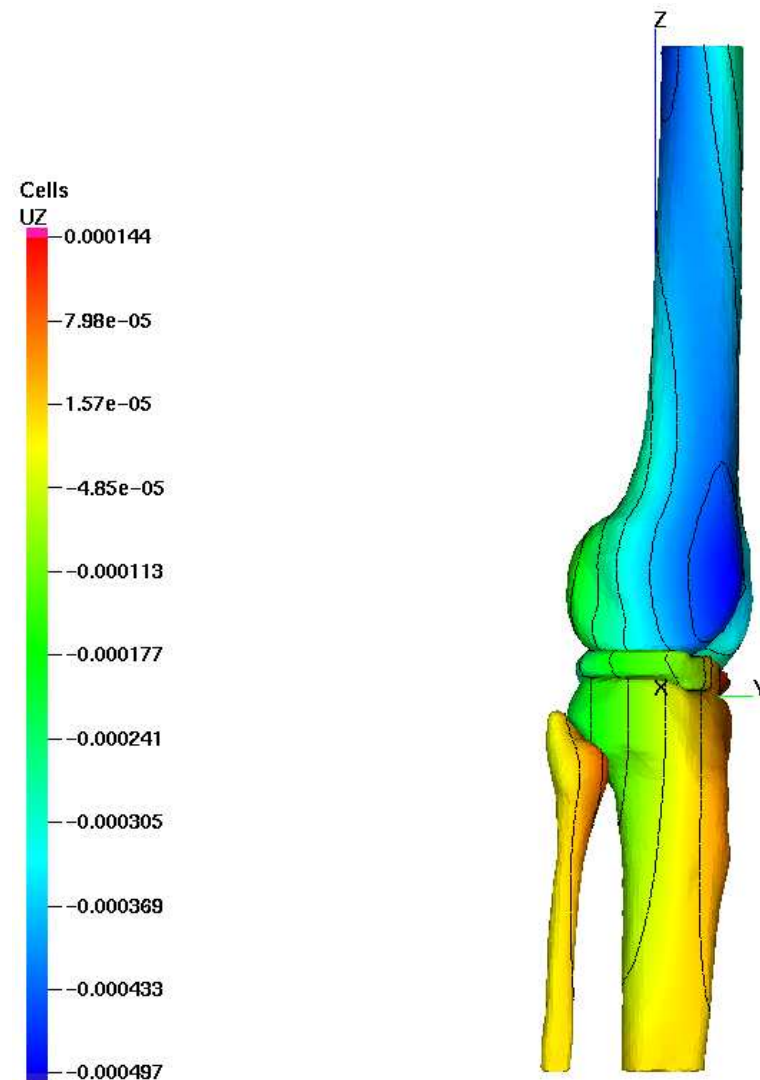
MODEL OF KNEE JOINT

vertical displacement



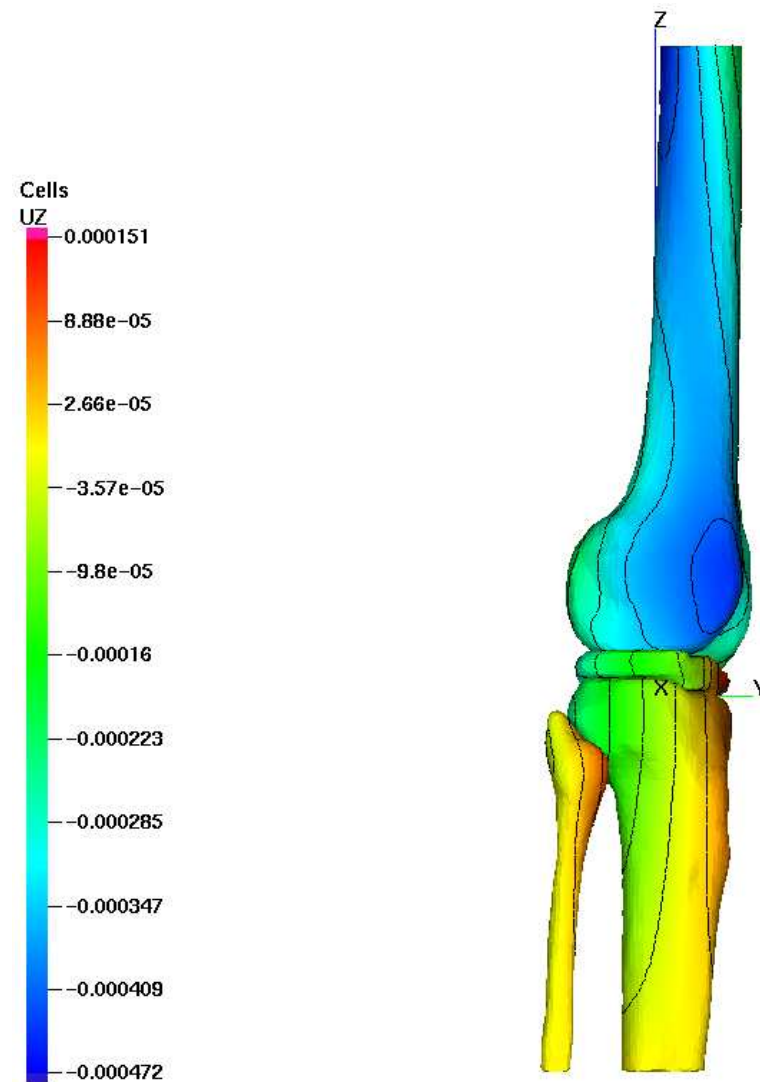
MODEL OF KNEE JOINT

vertical displacement



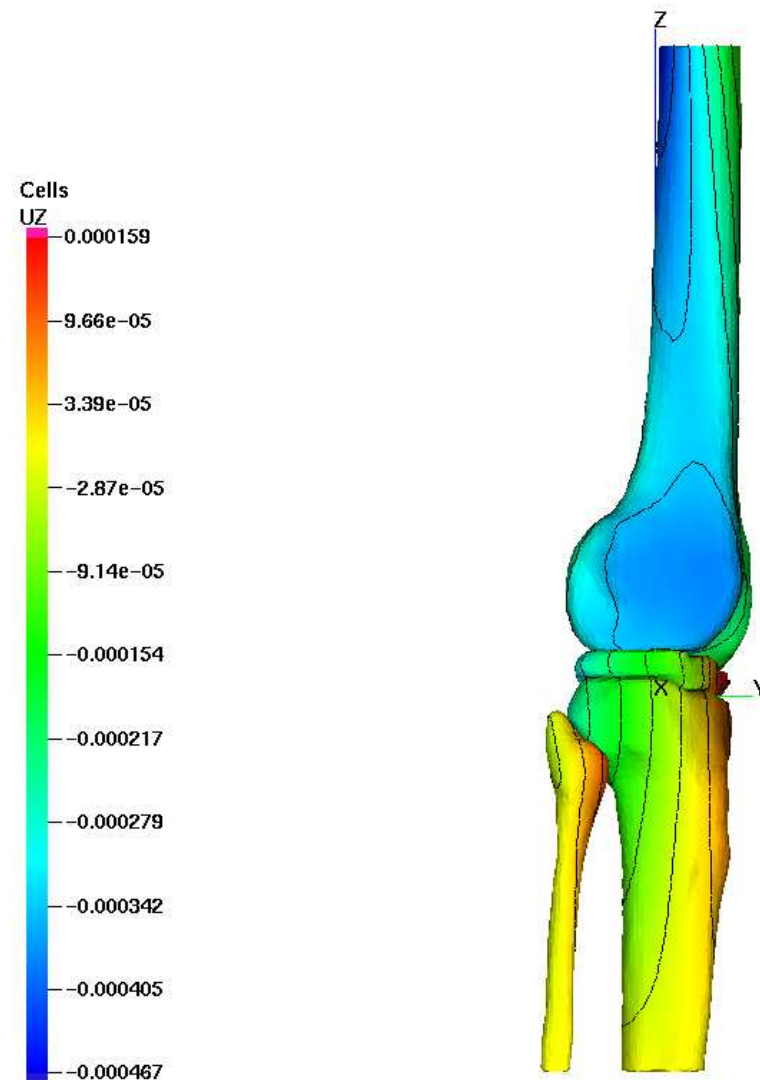
MODEL OF KNEE JOINT

vertical displacement



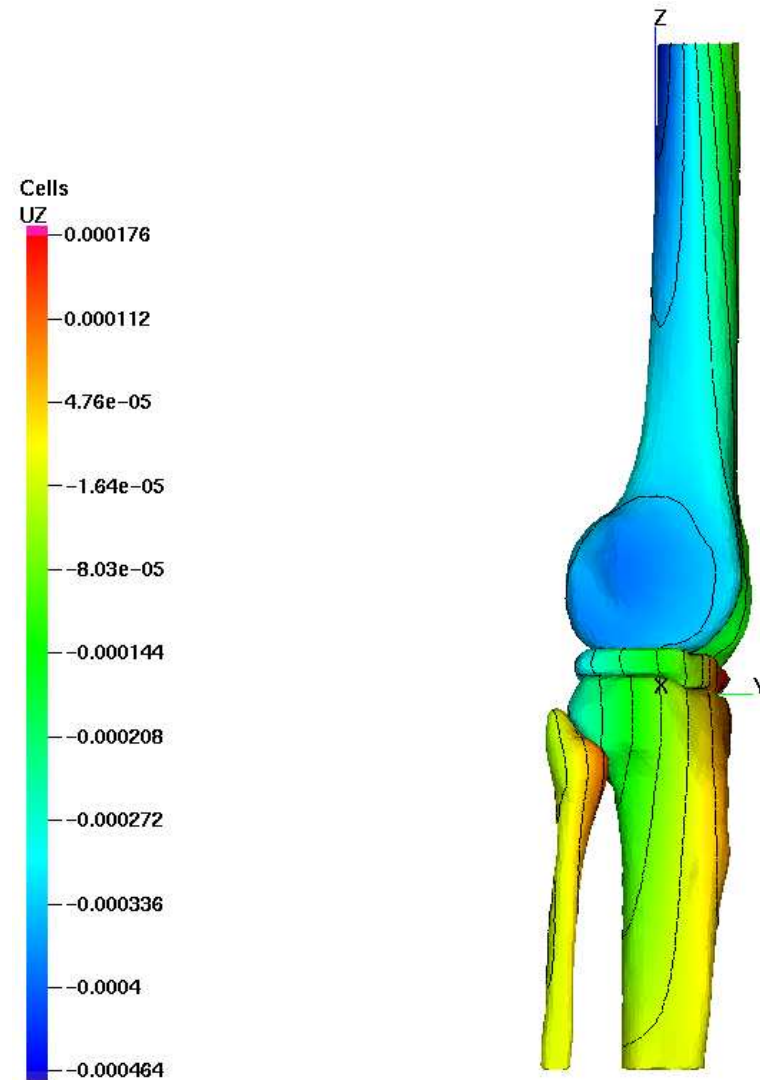
MODEL OF KNEE JOINT

vertical displacement



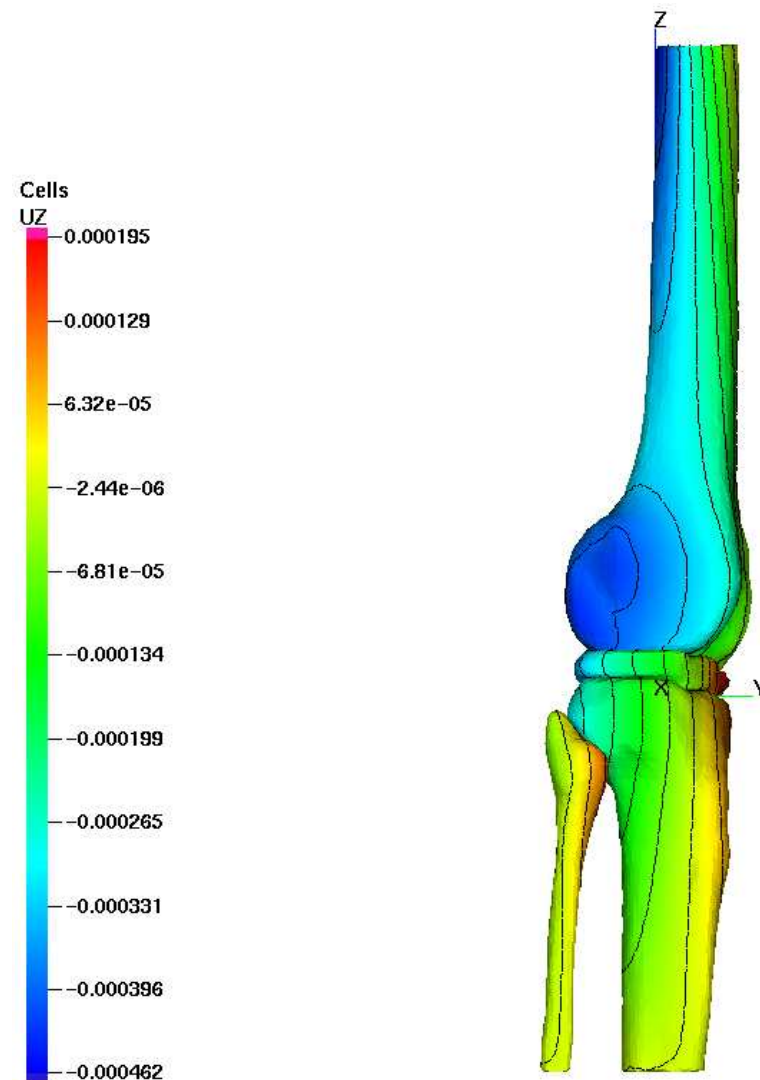
MODEL OF KNEE JOINT

vertical displacement



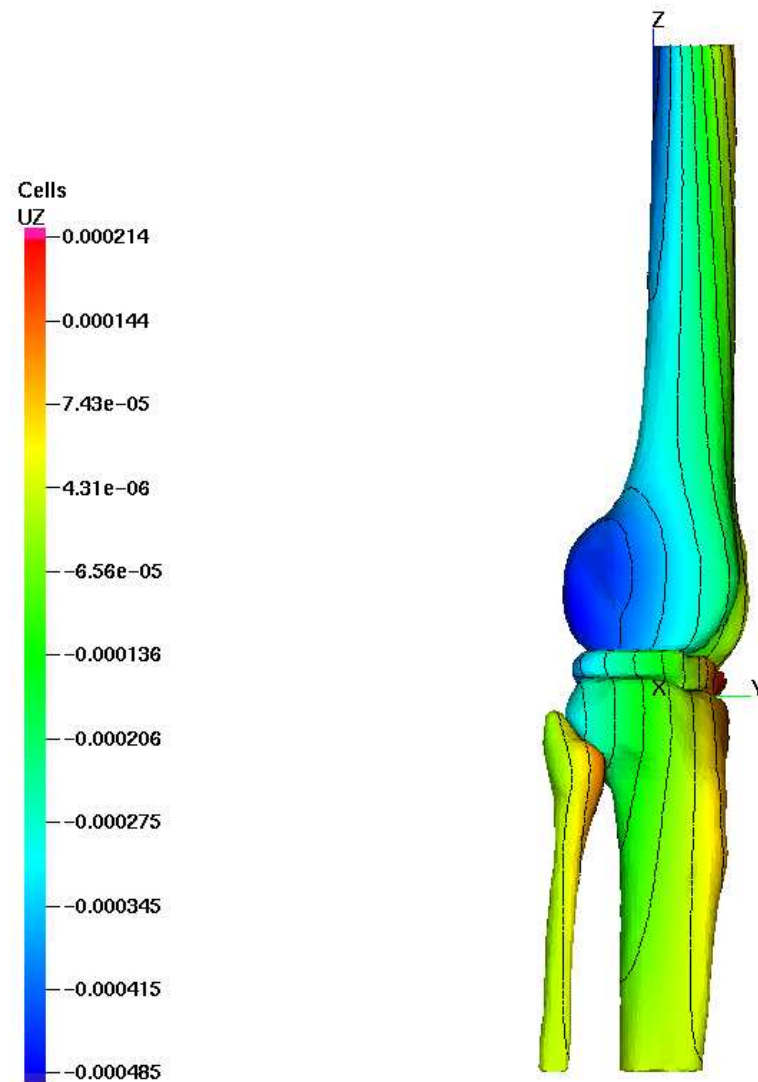
MODEL OF KNEE JOINT

vertical displacement



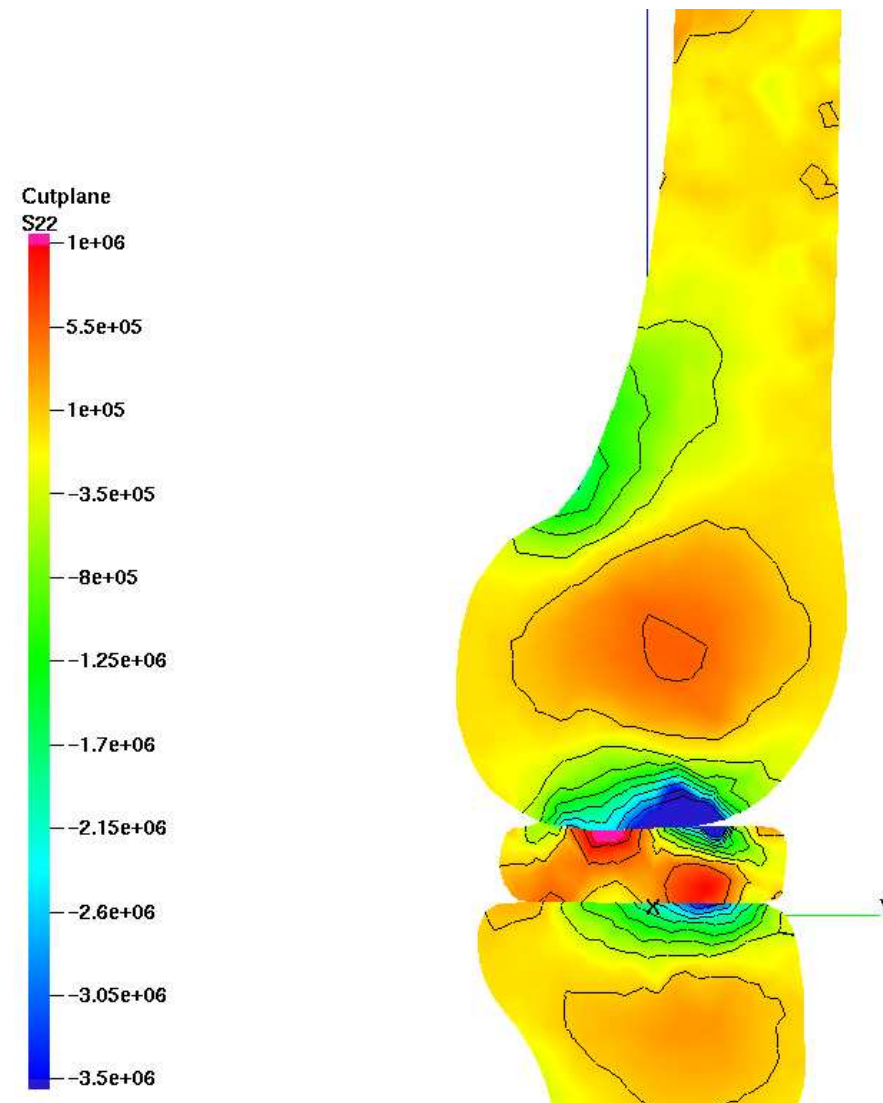
MODEL OF KNEE JOINT

vertical displacement



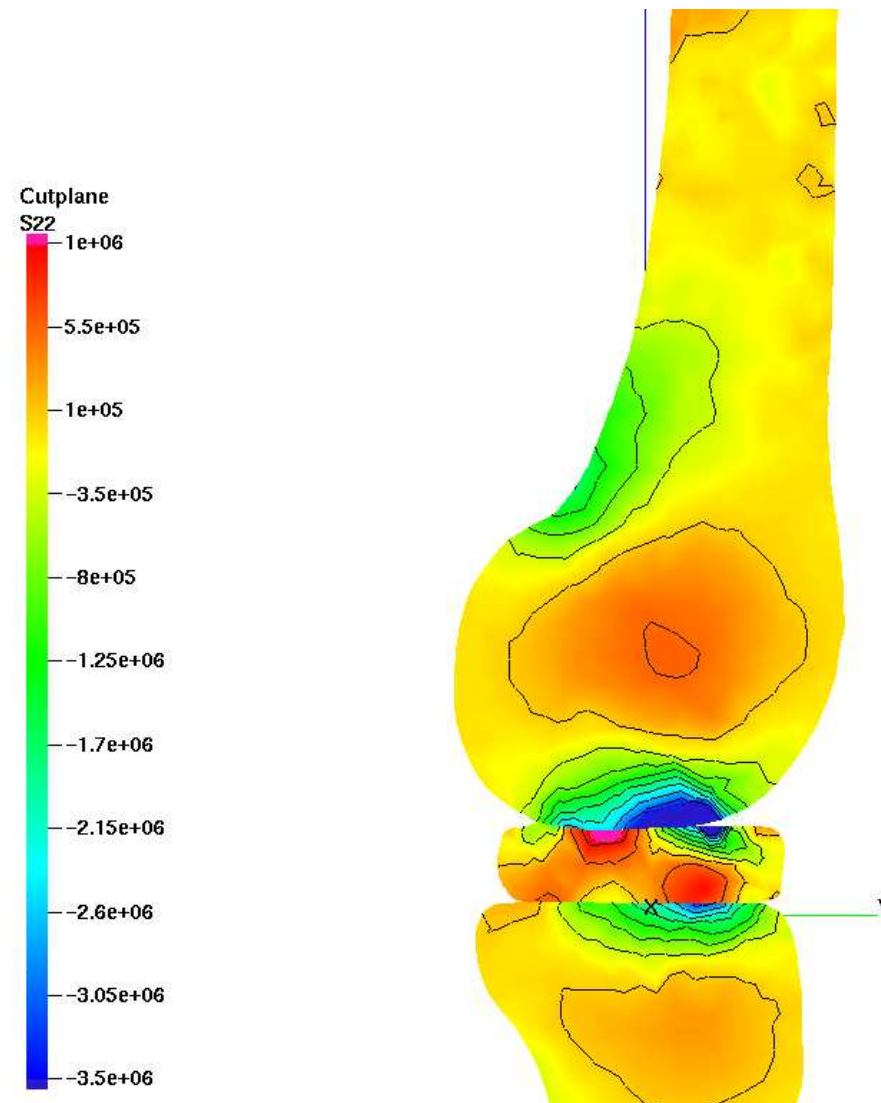
MODEL OF KNEE JOINT

component τ_{yy} of the stress tensor on outer condyl



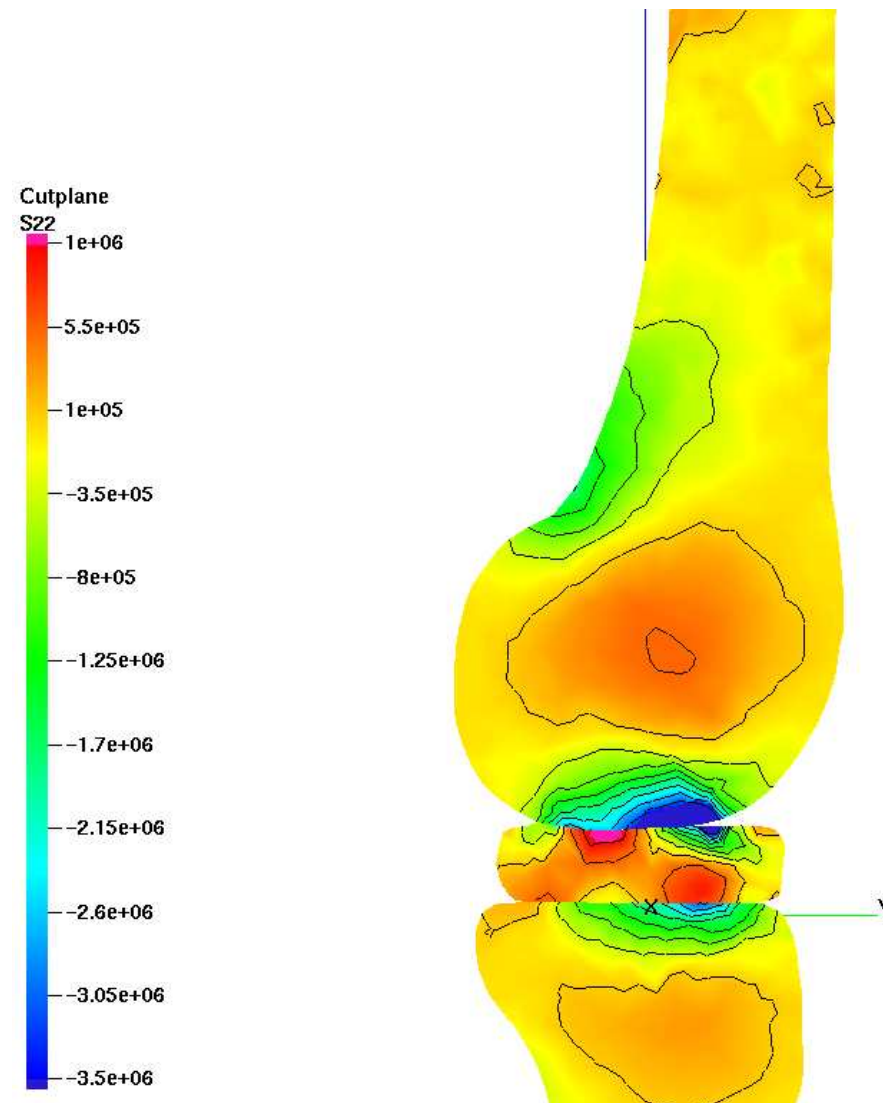
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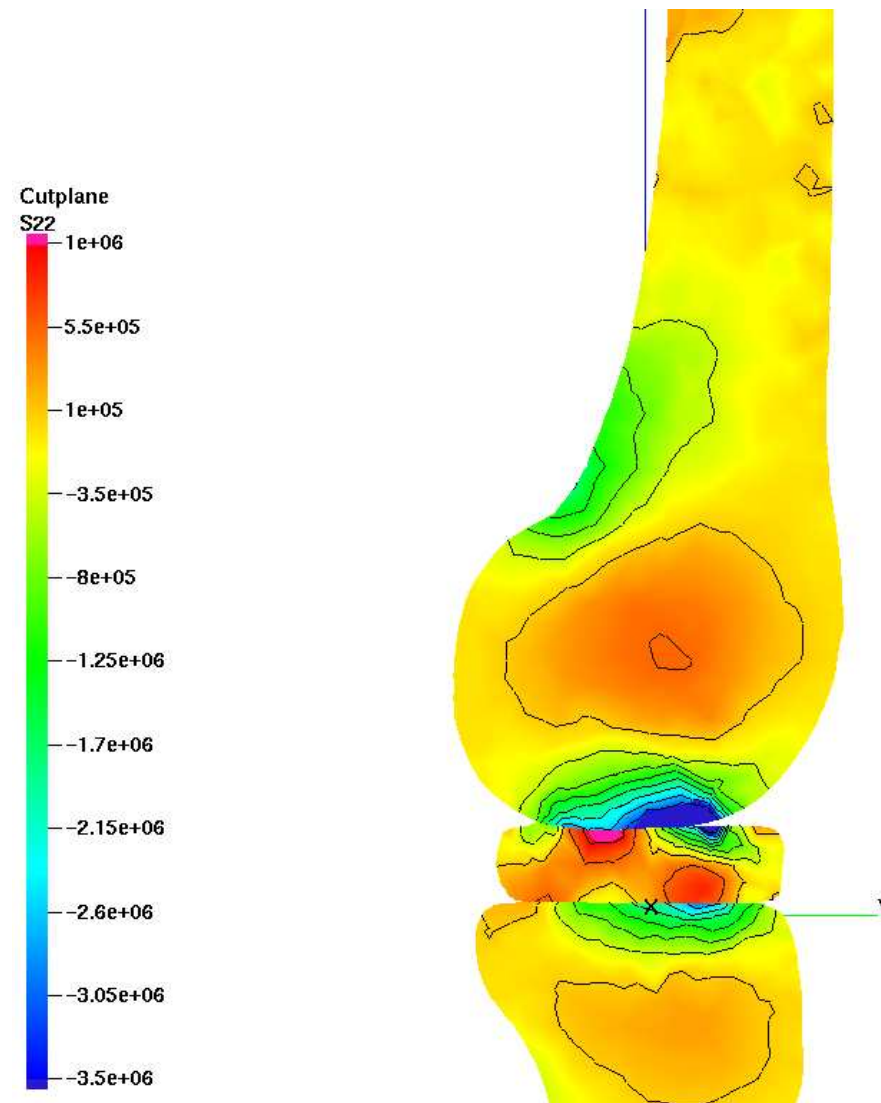
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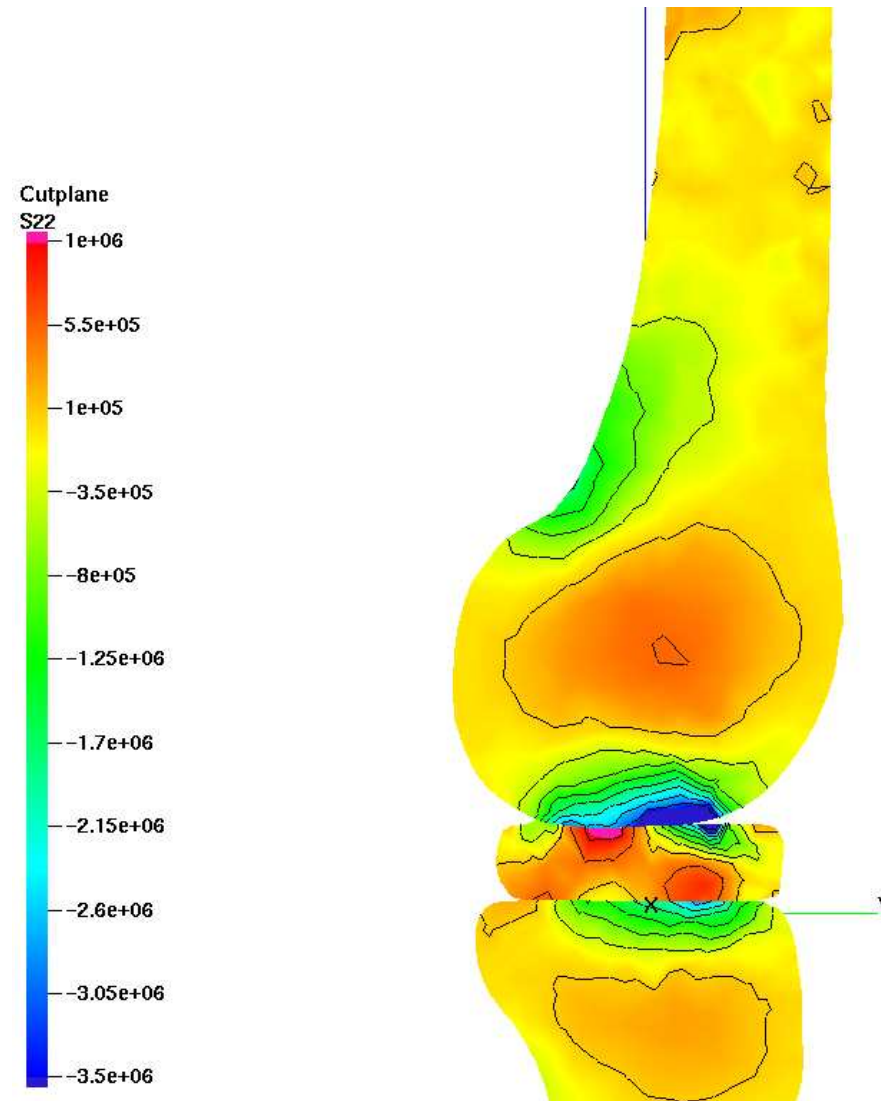
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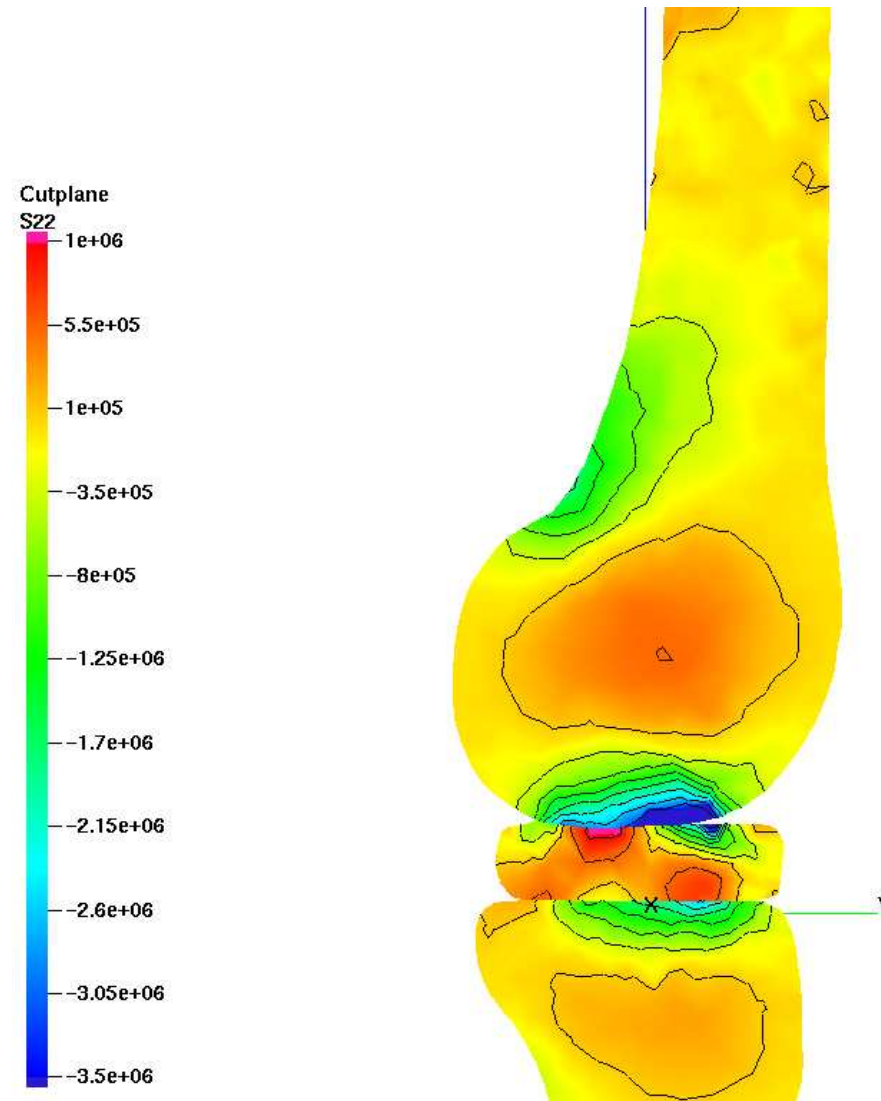
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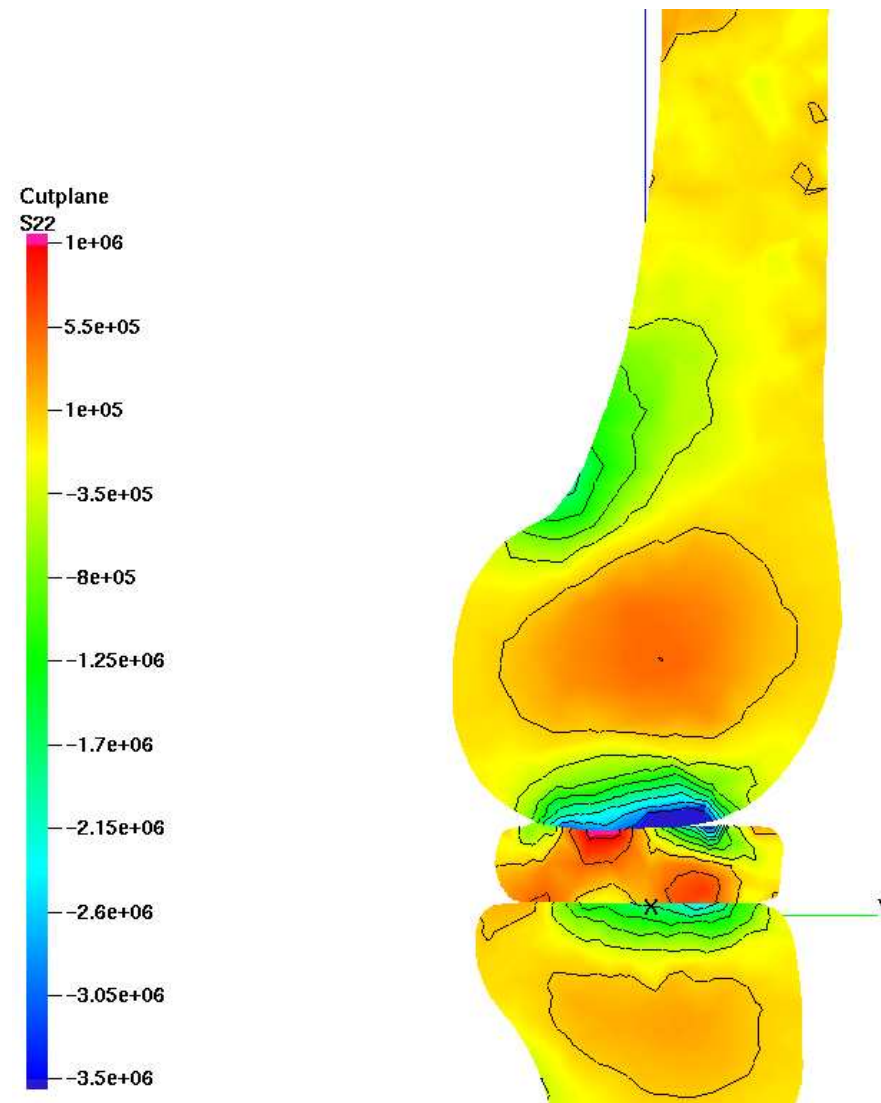
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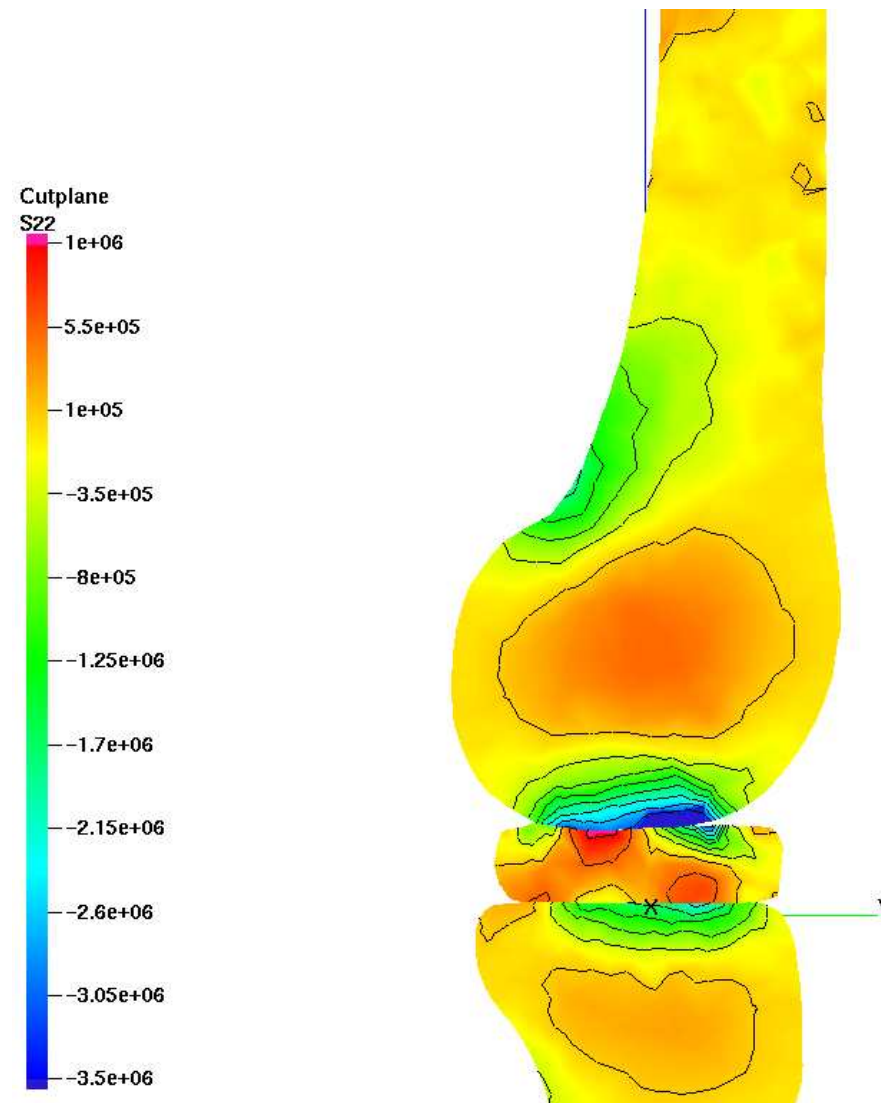
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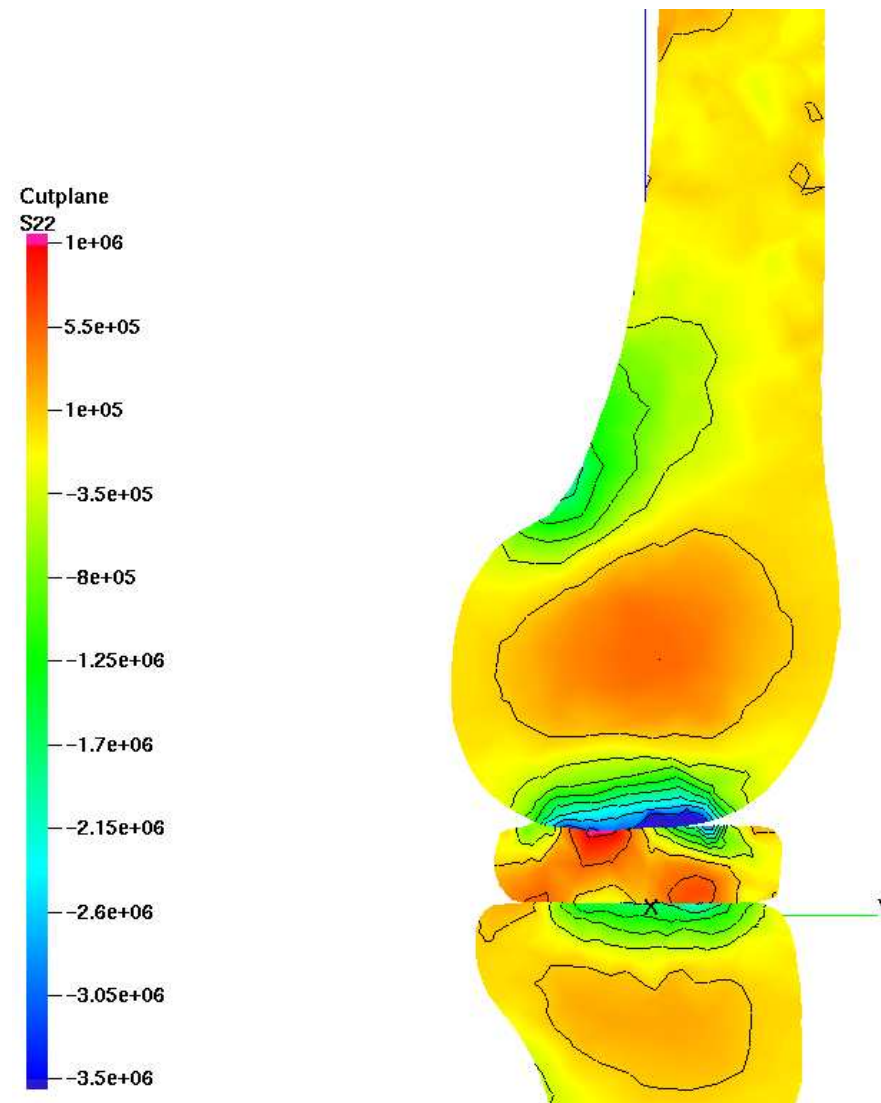
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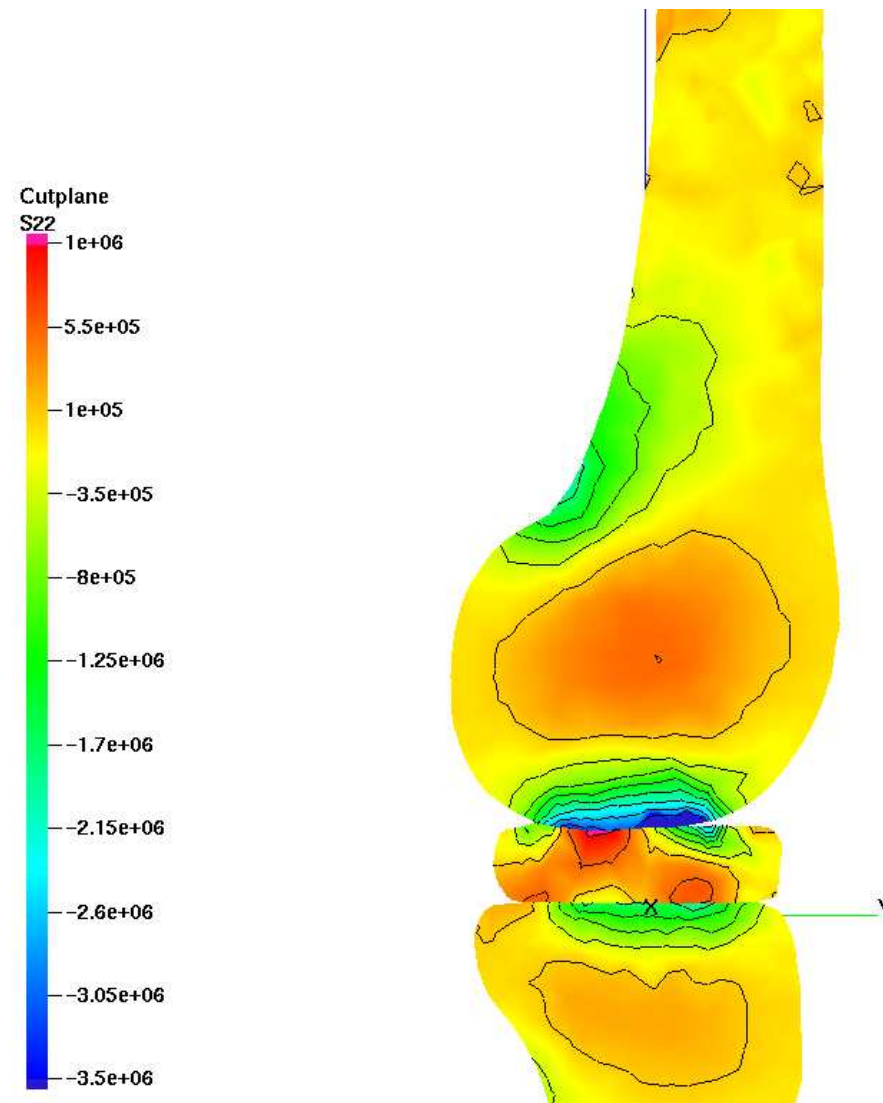
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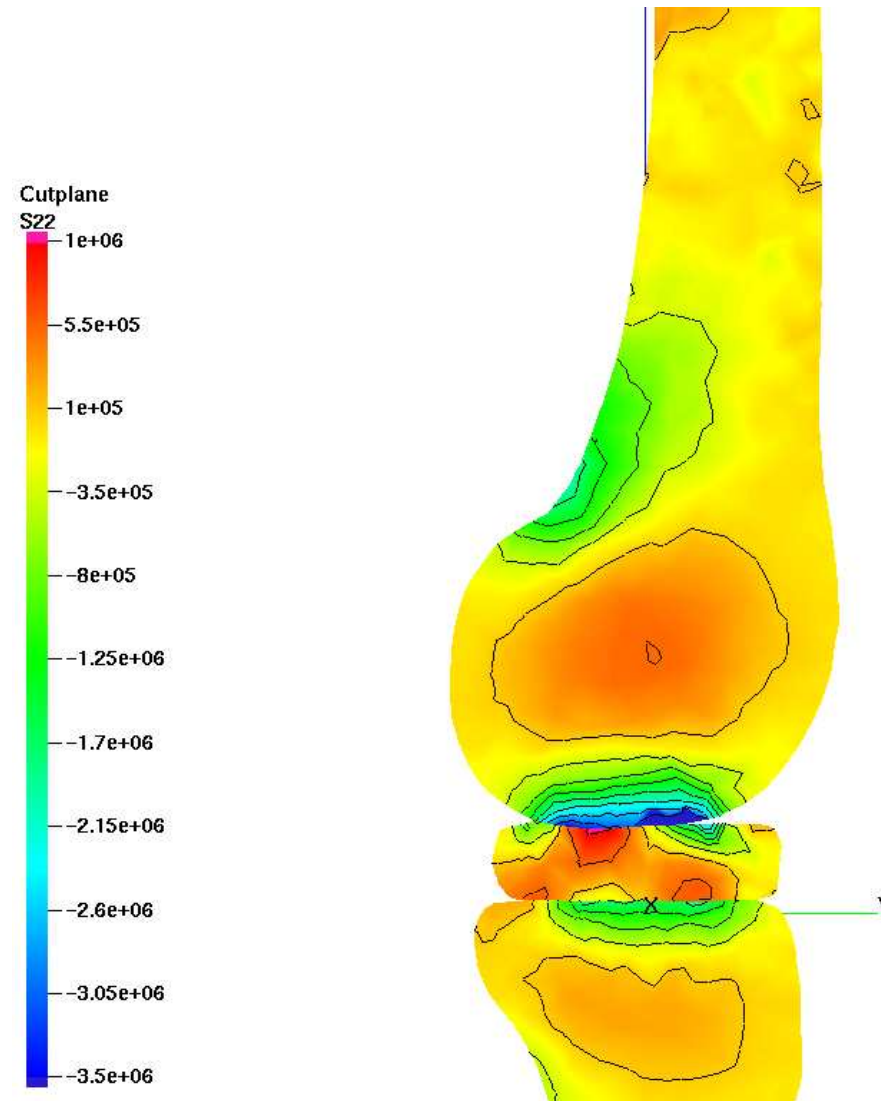
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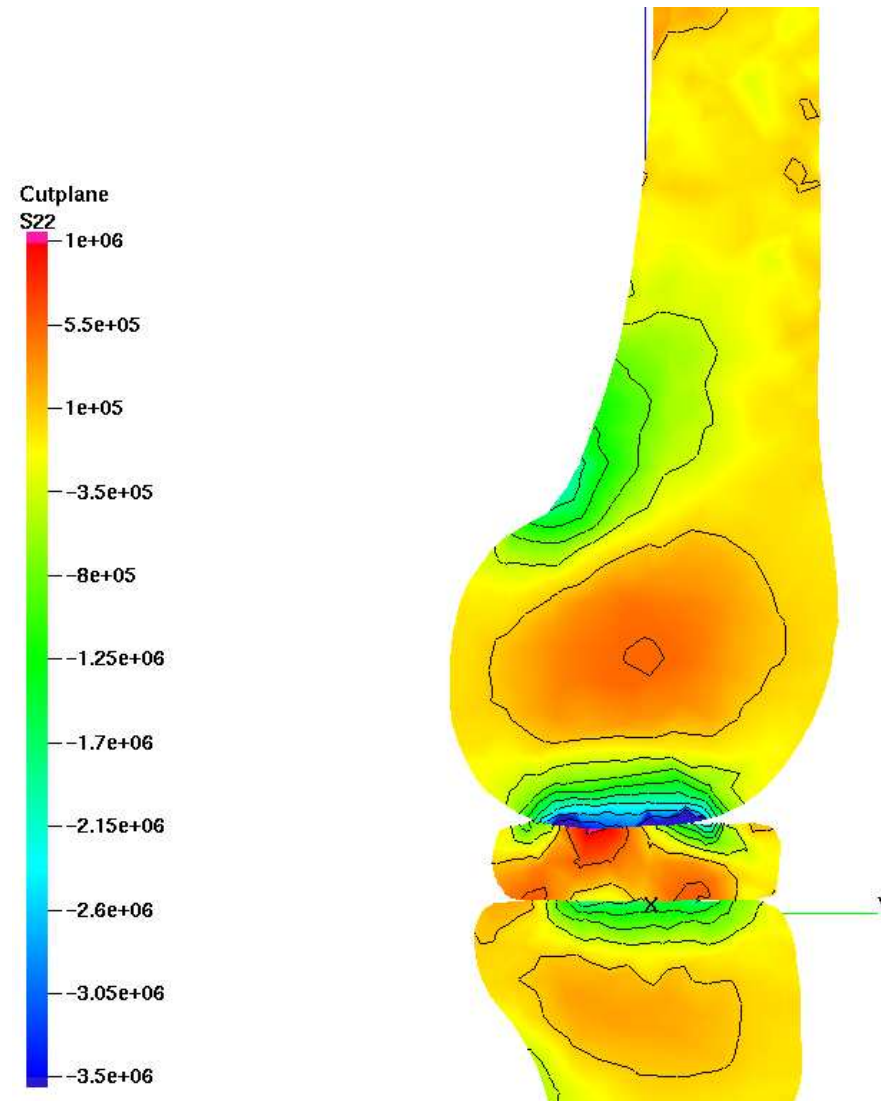
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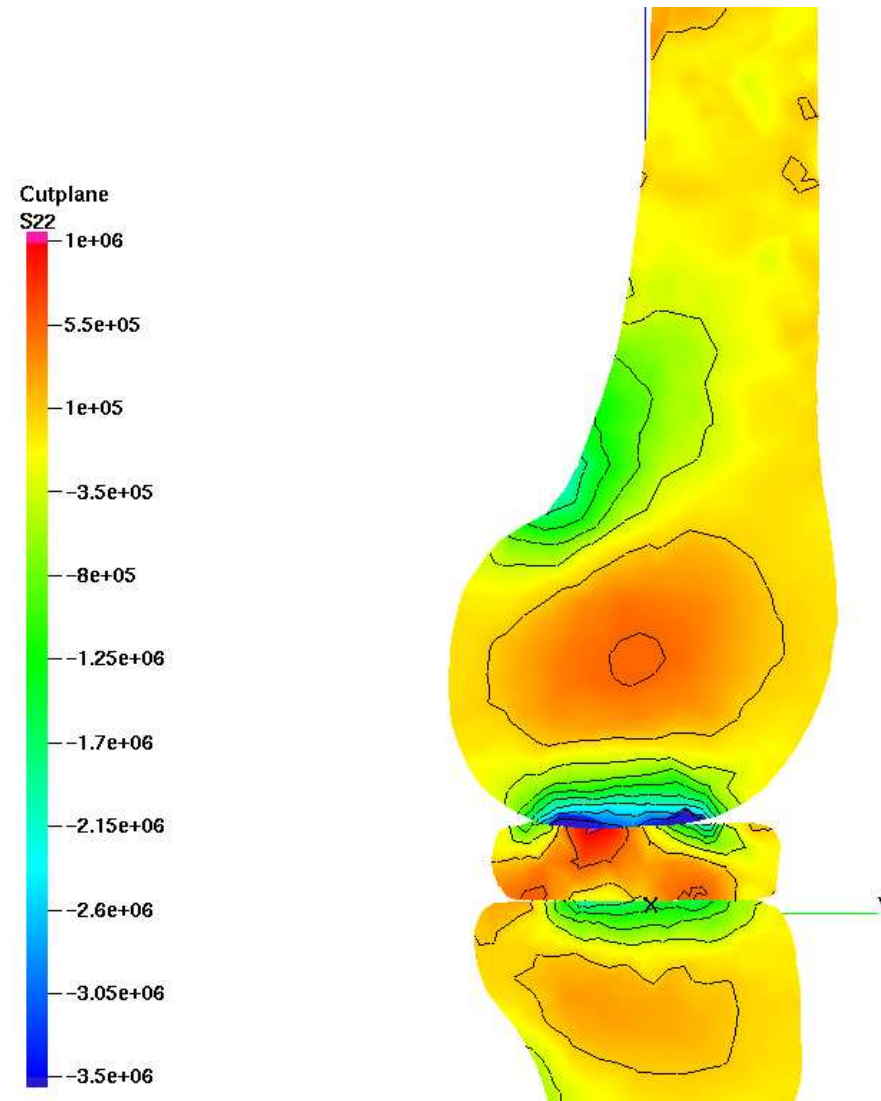
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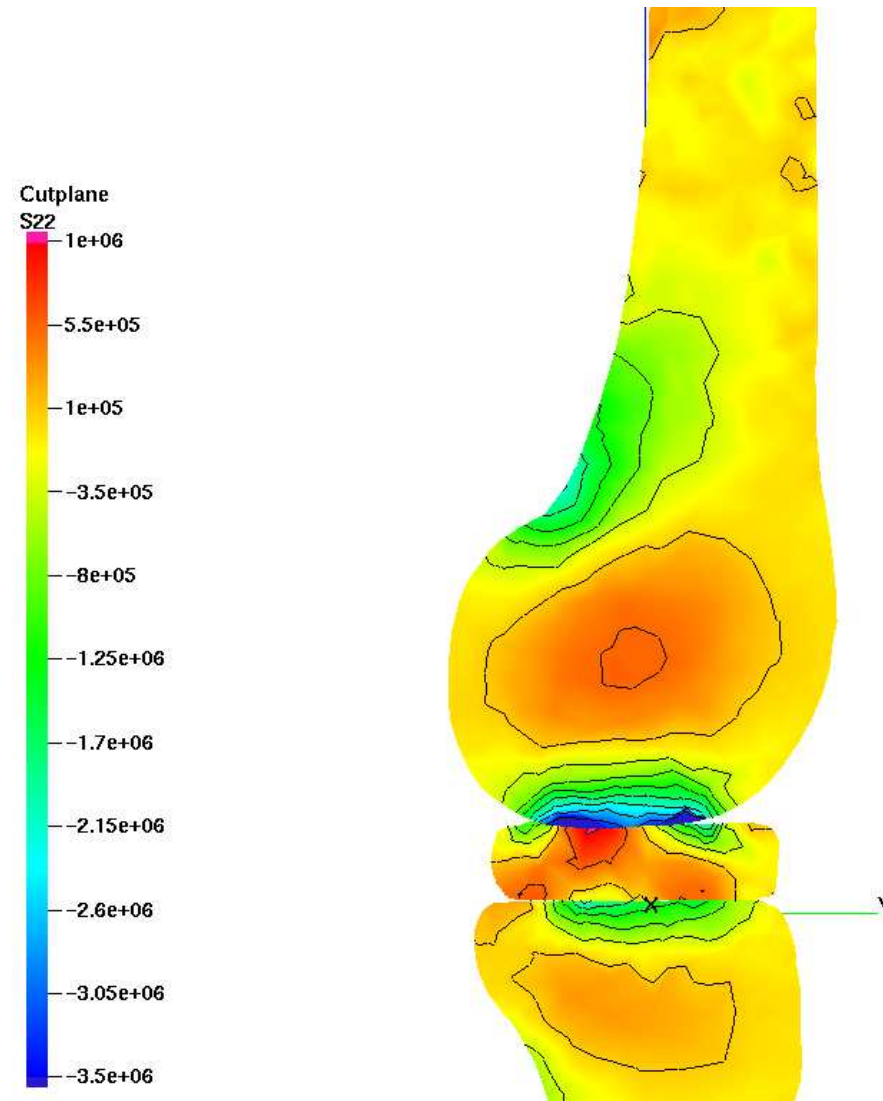
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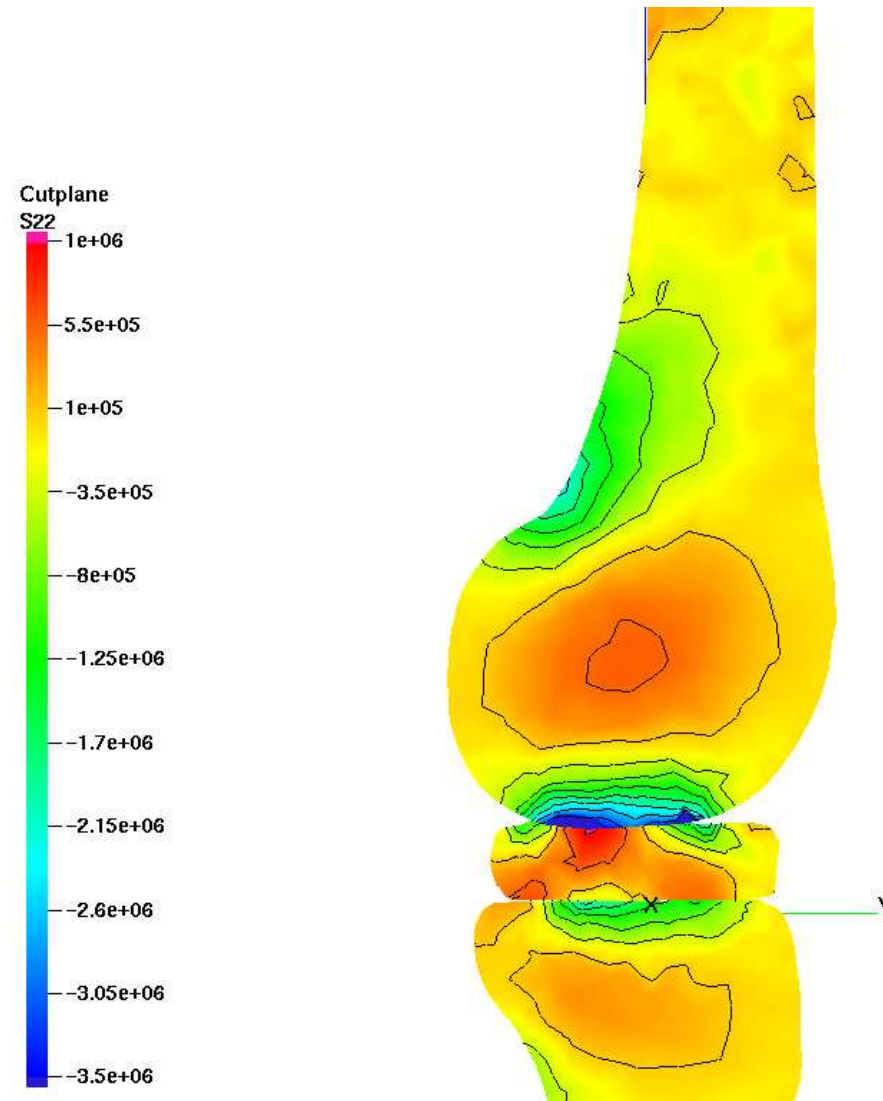
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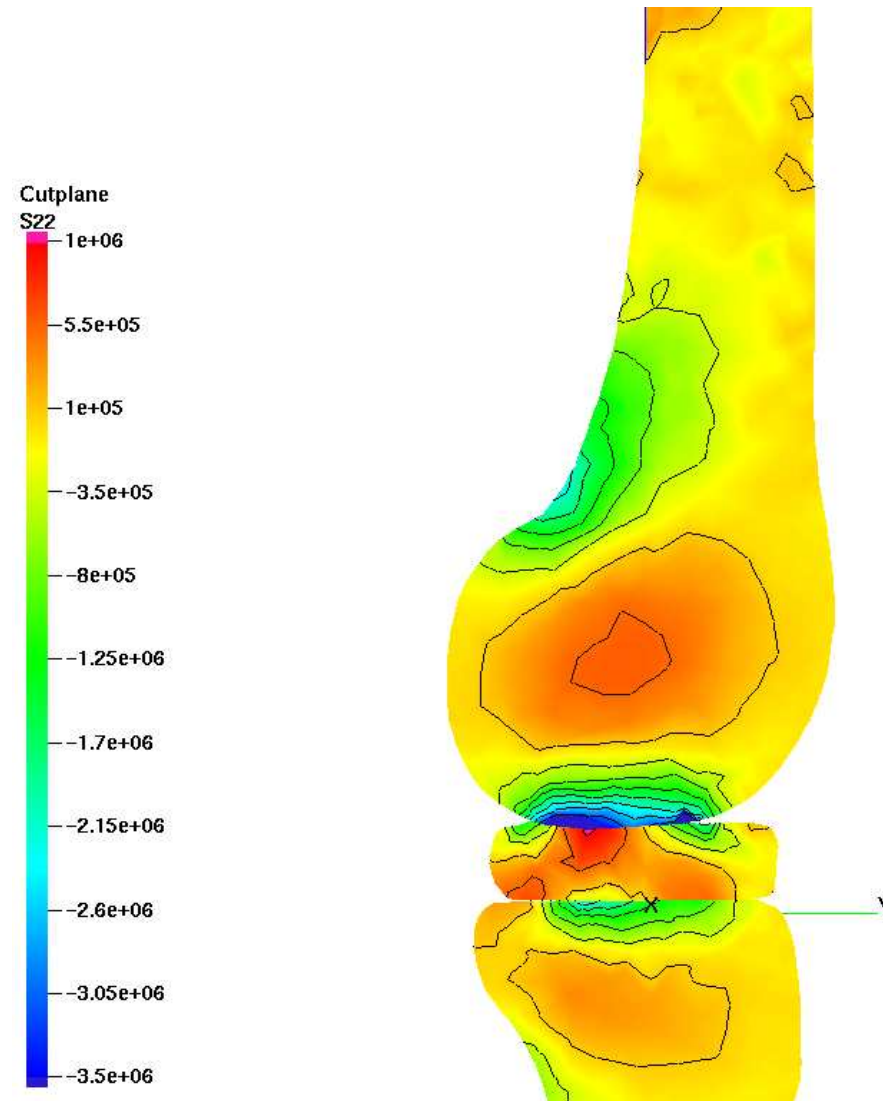
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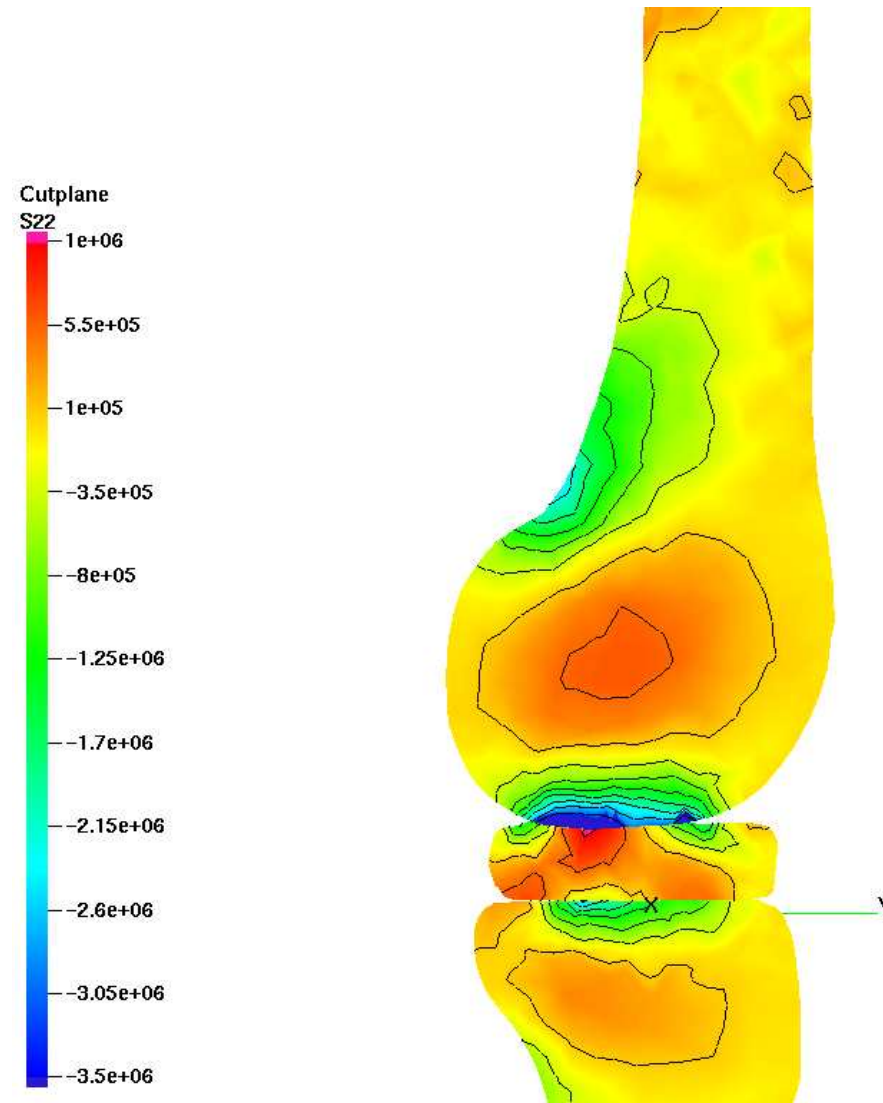
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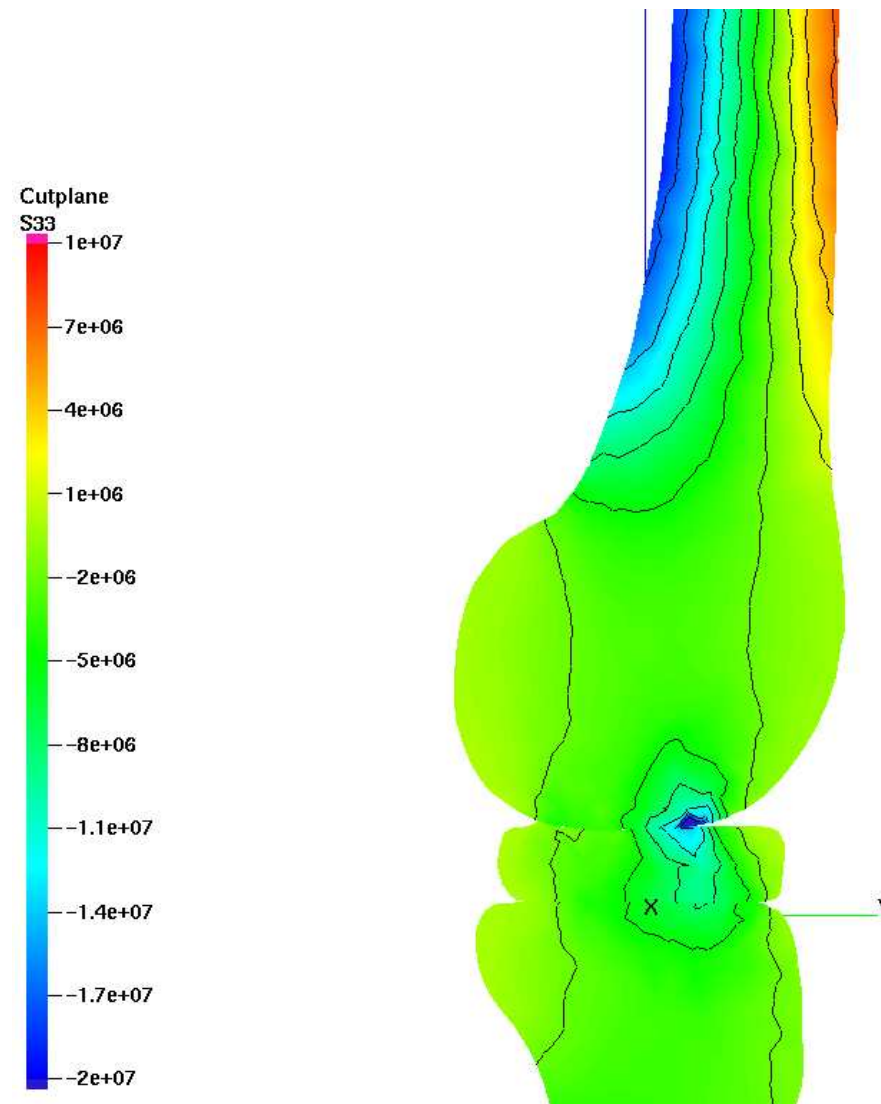
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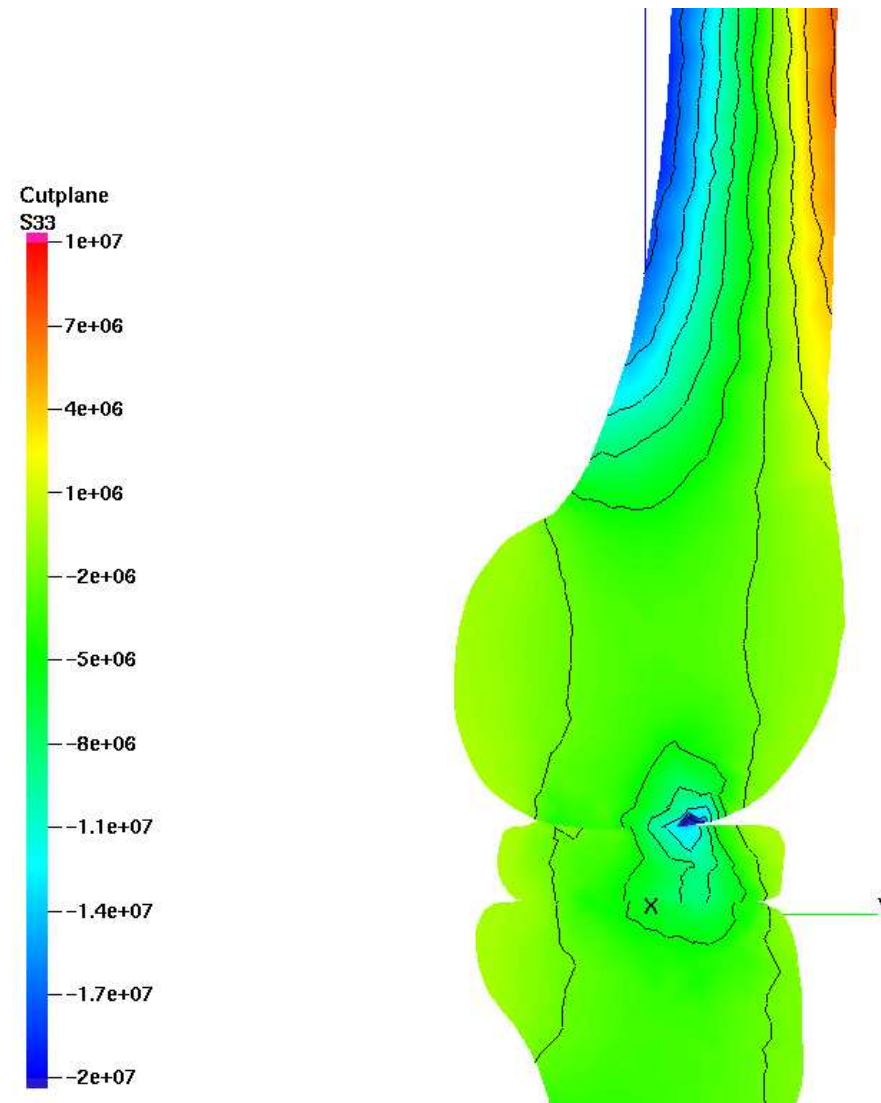
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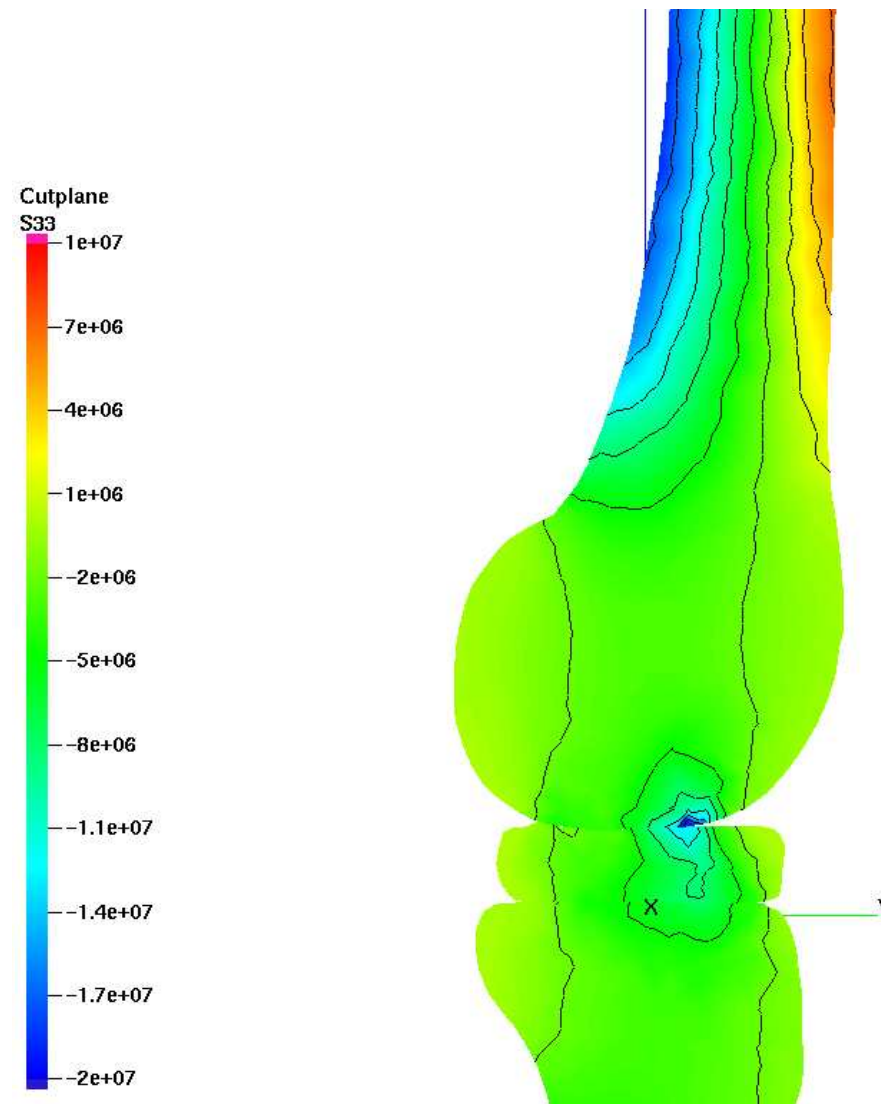
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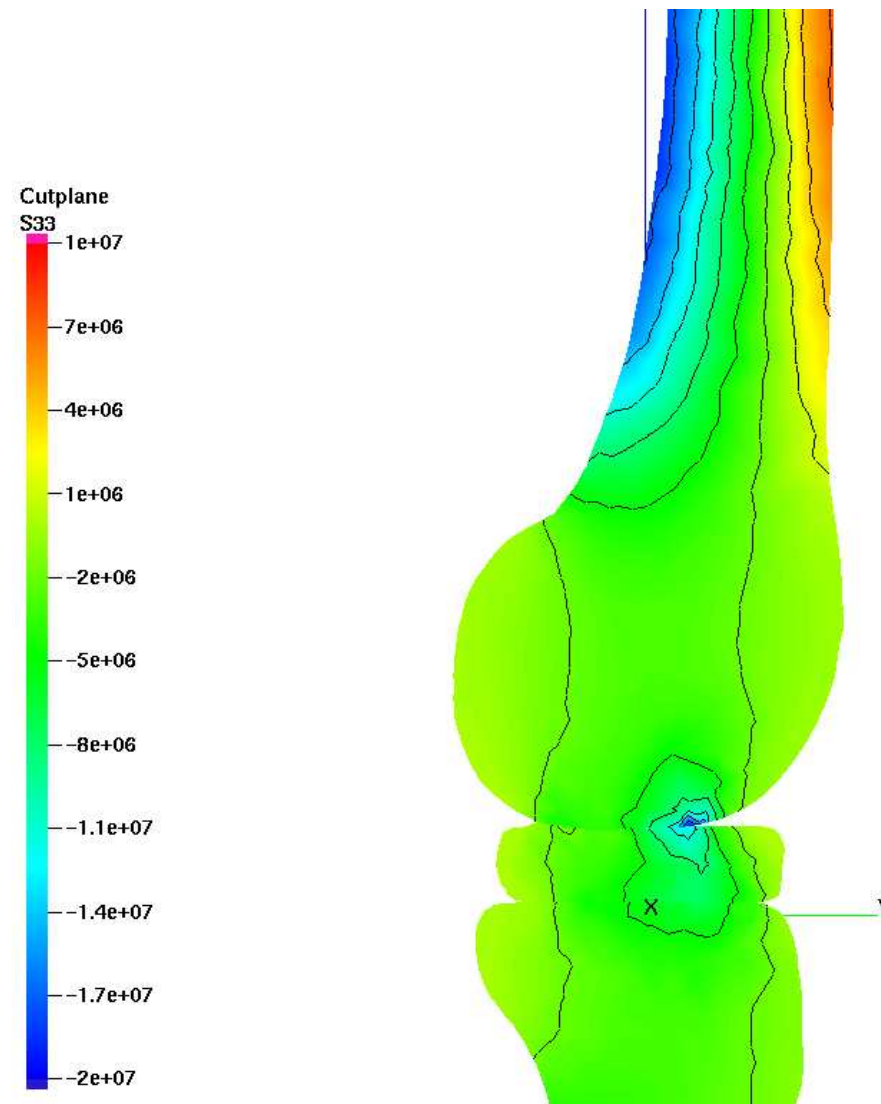
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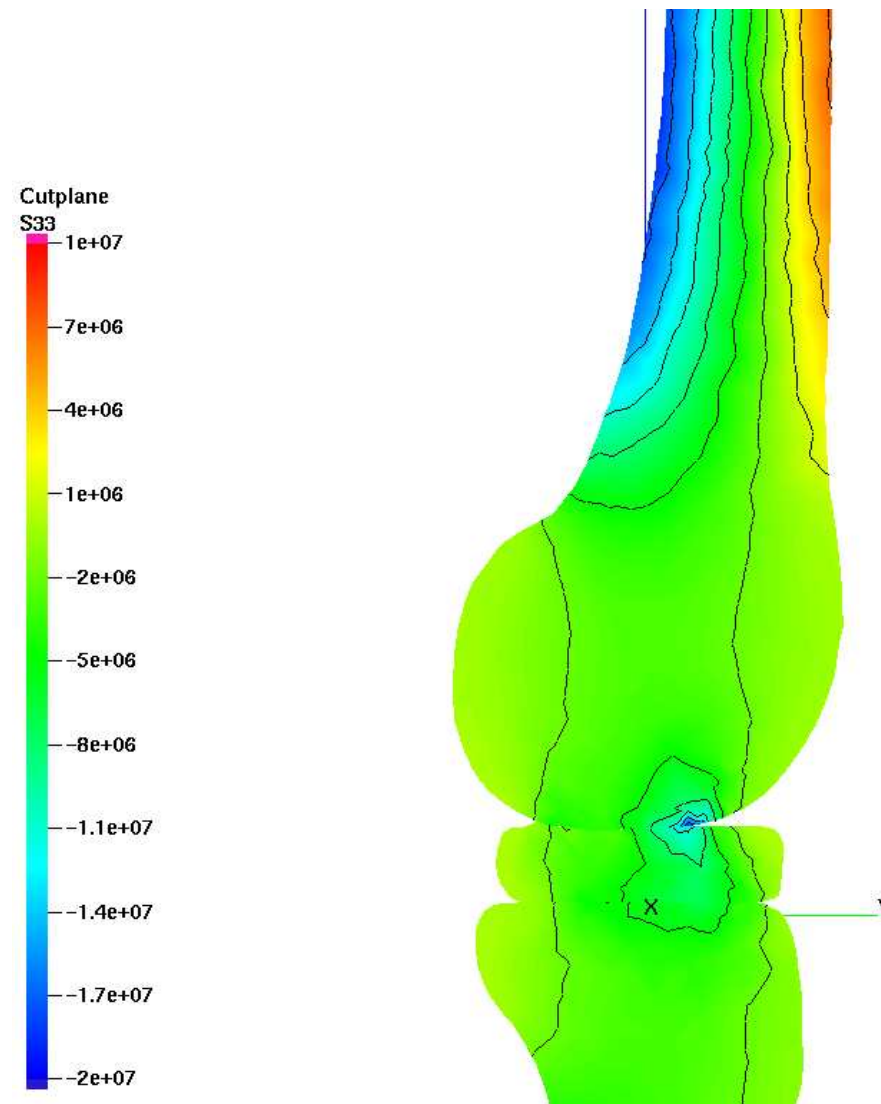
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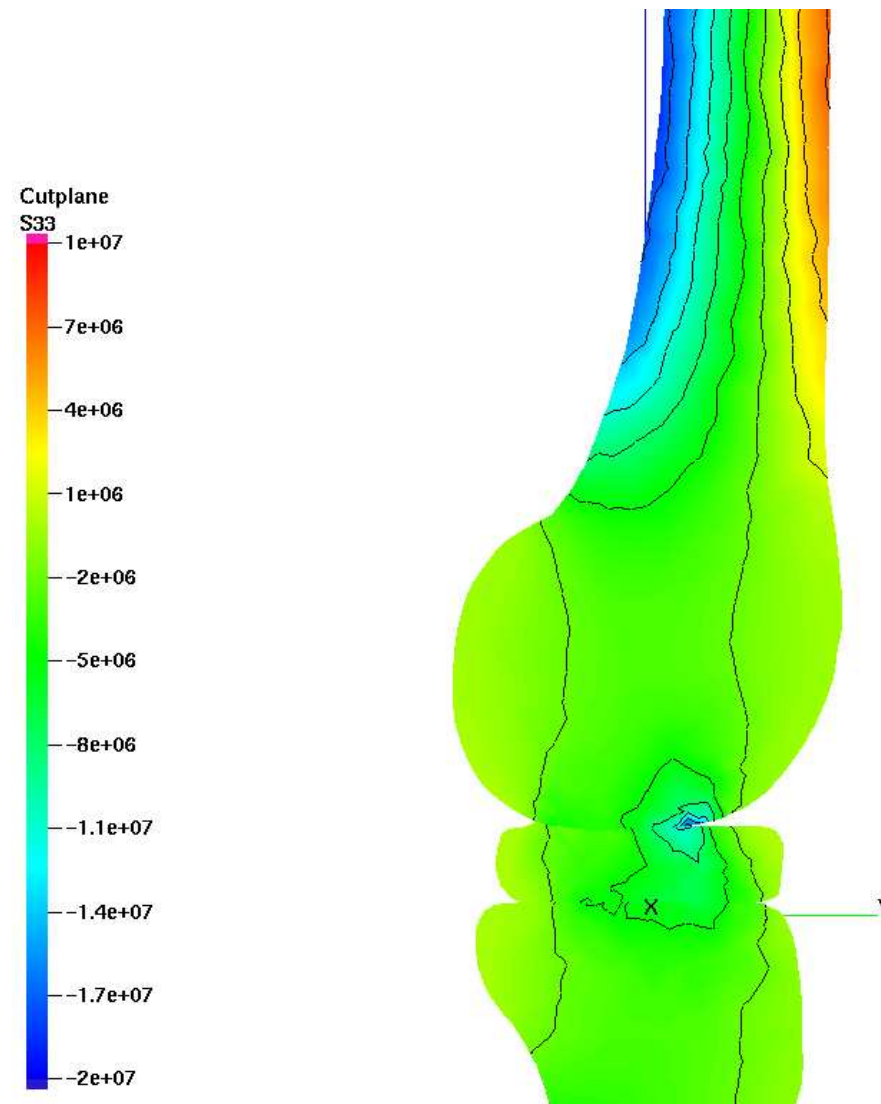
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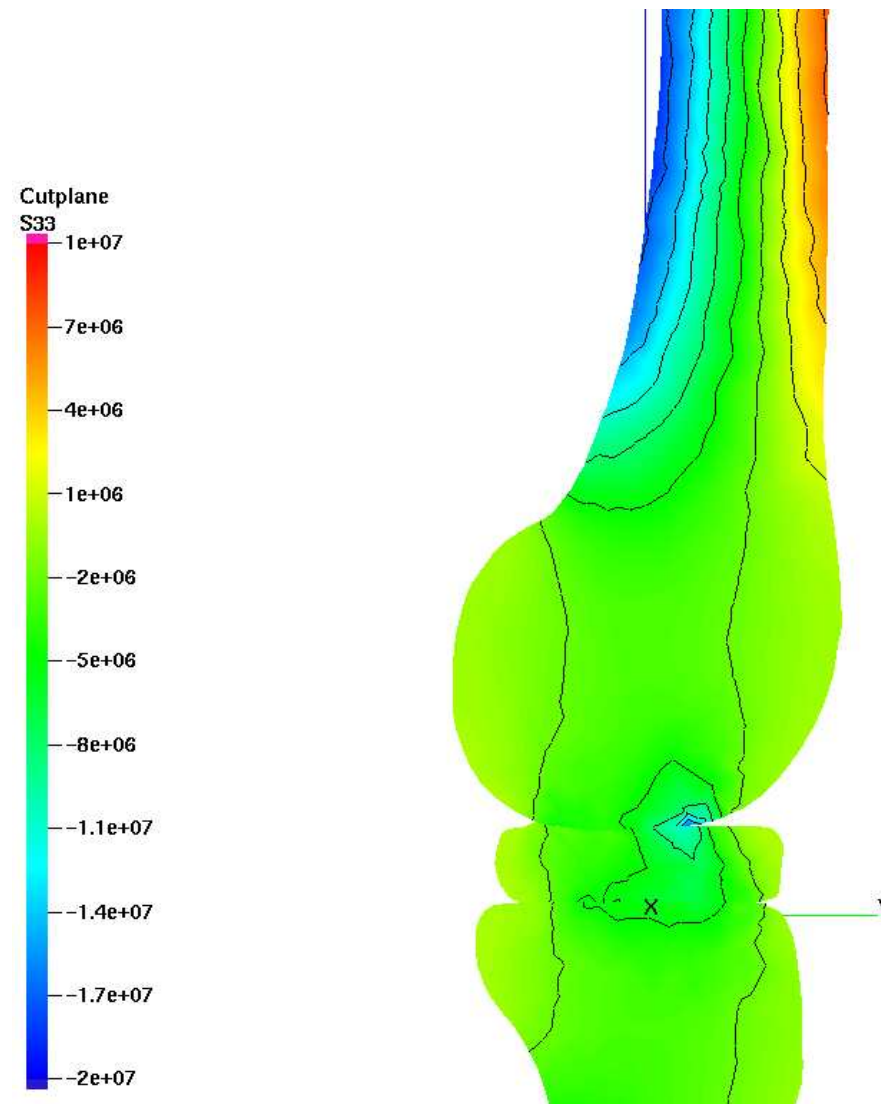
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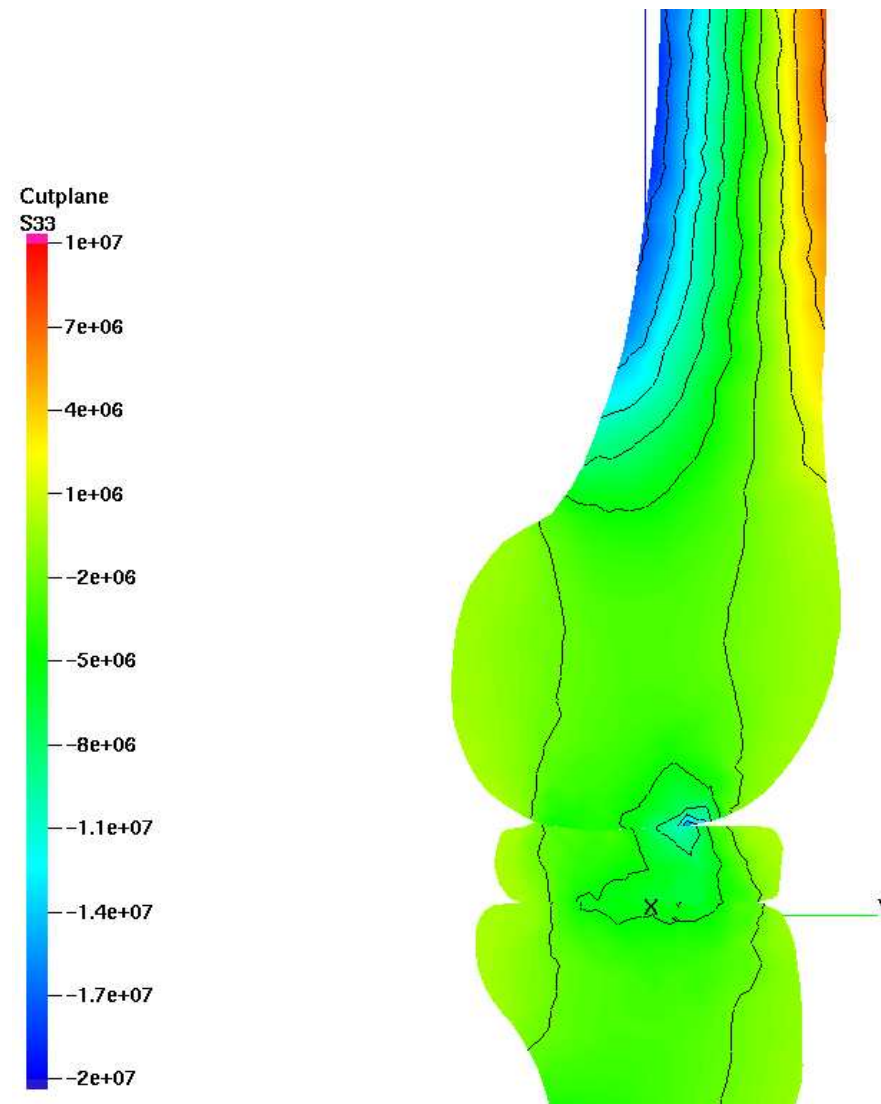
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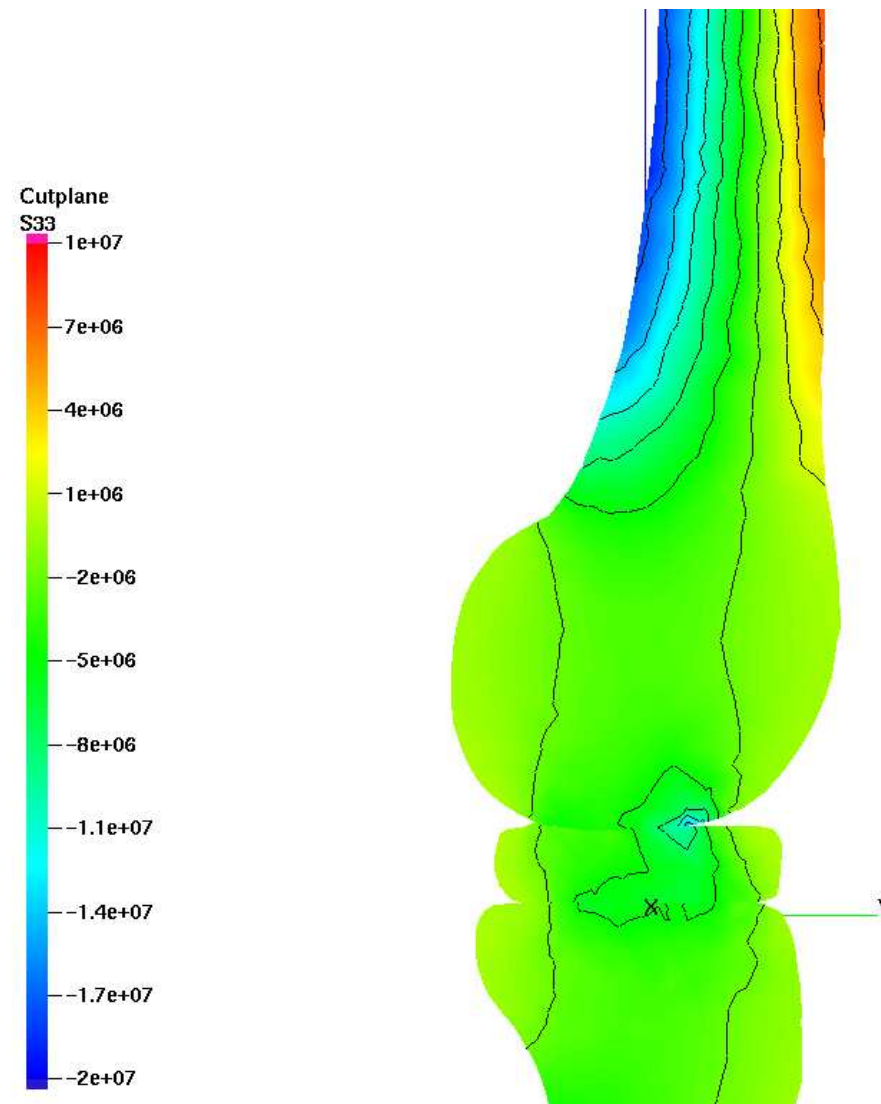
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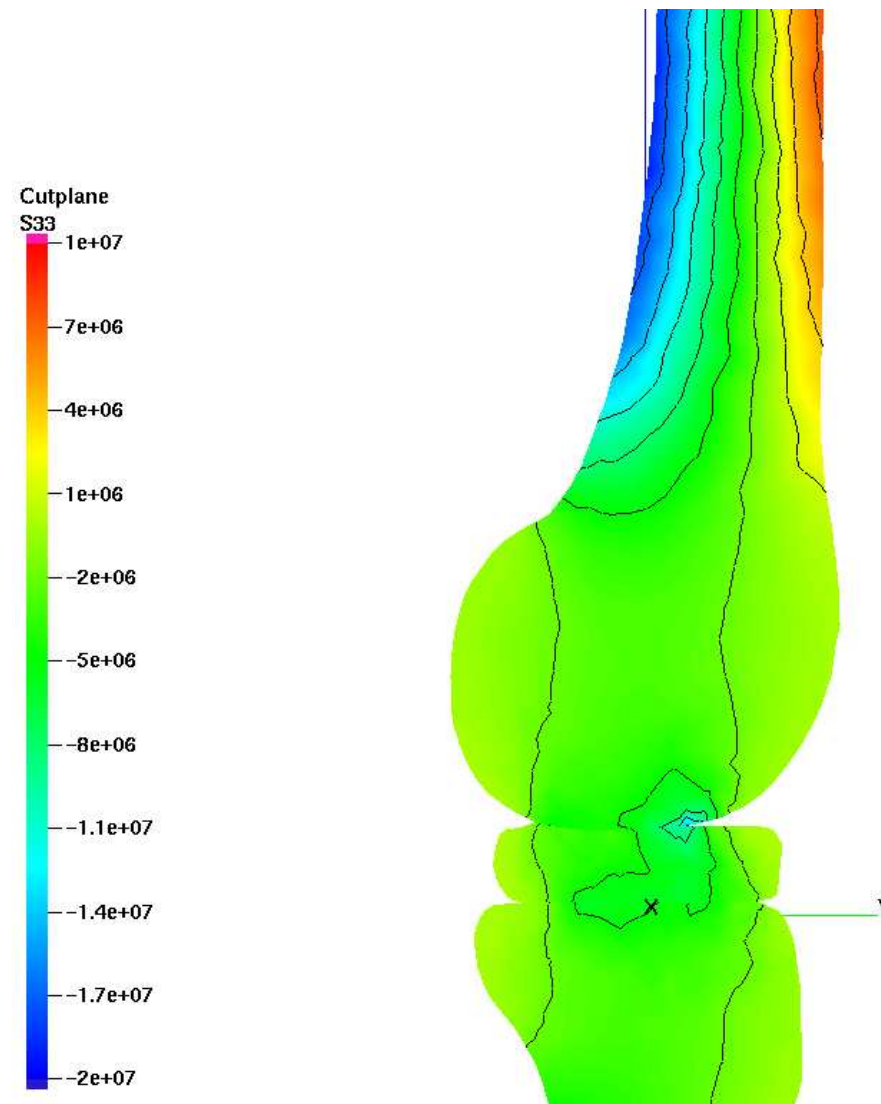
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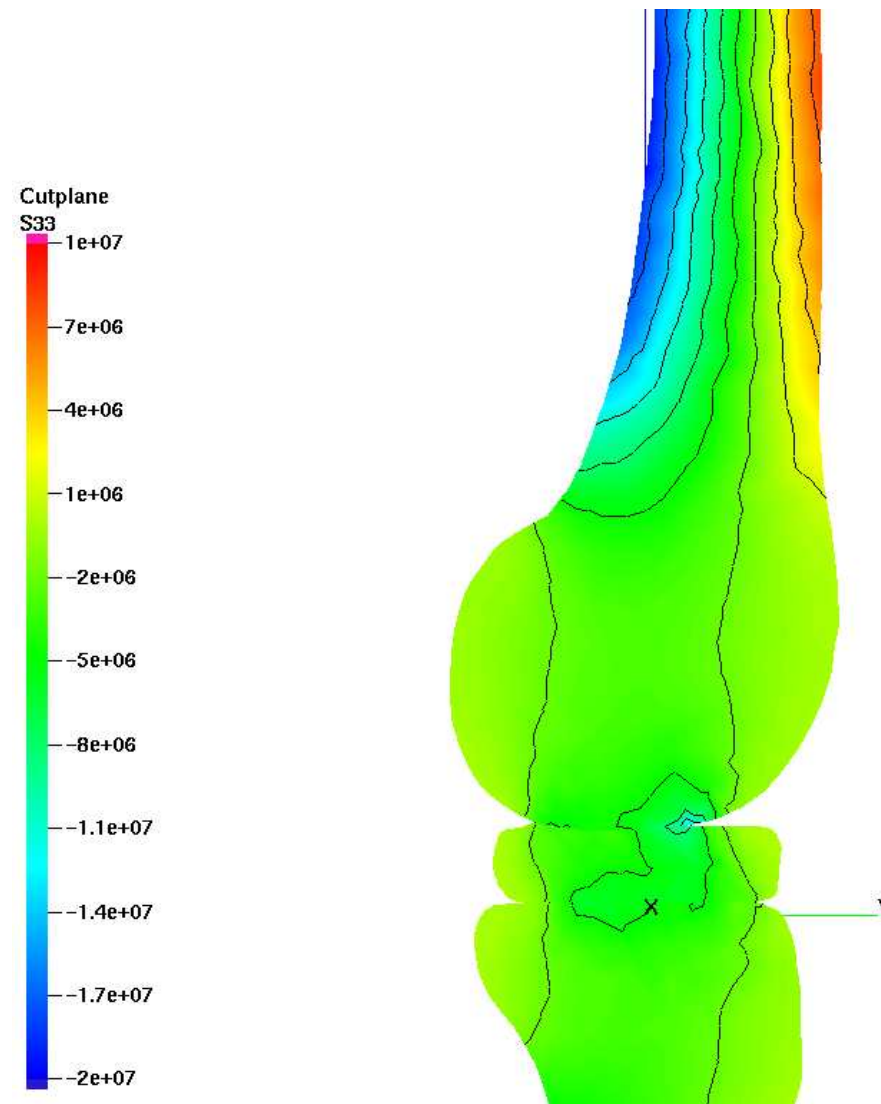
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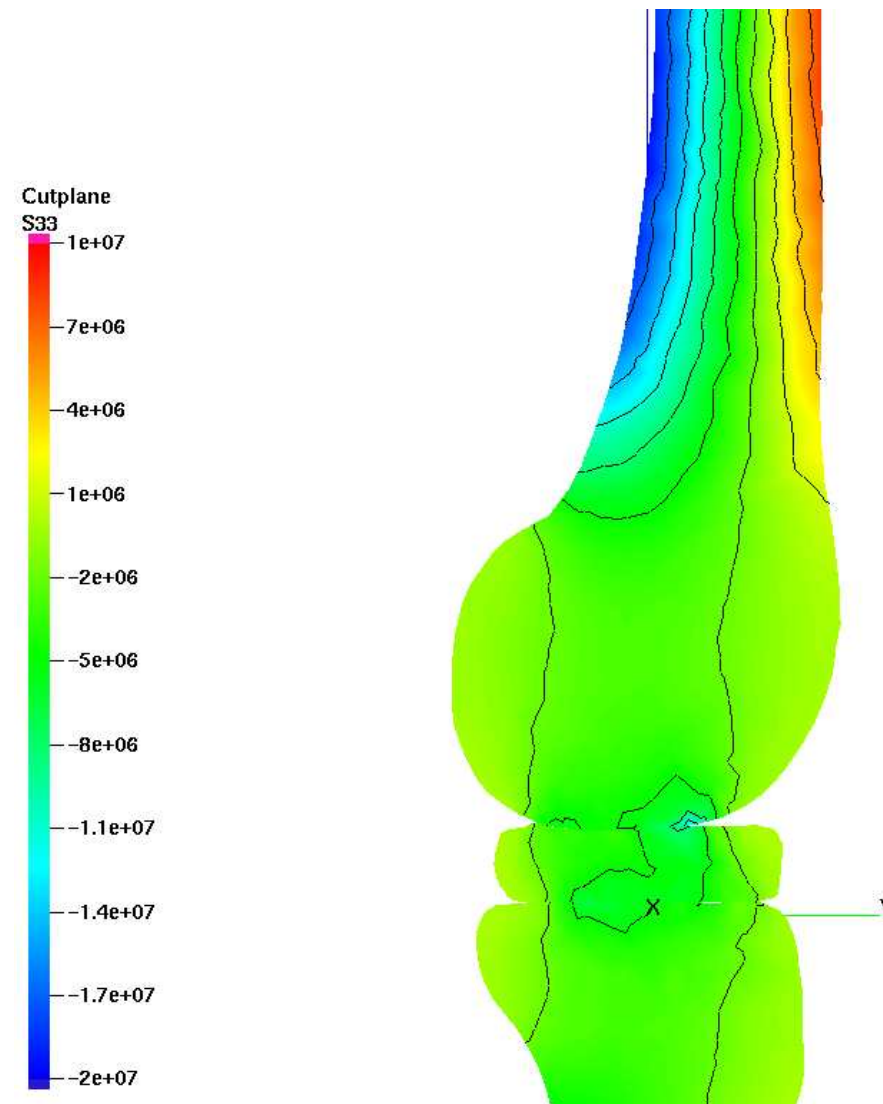
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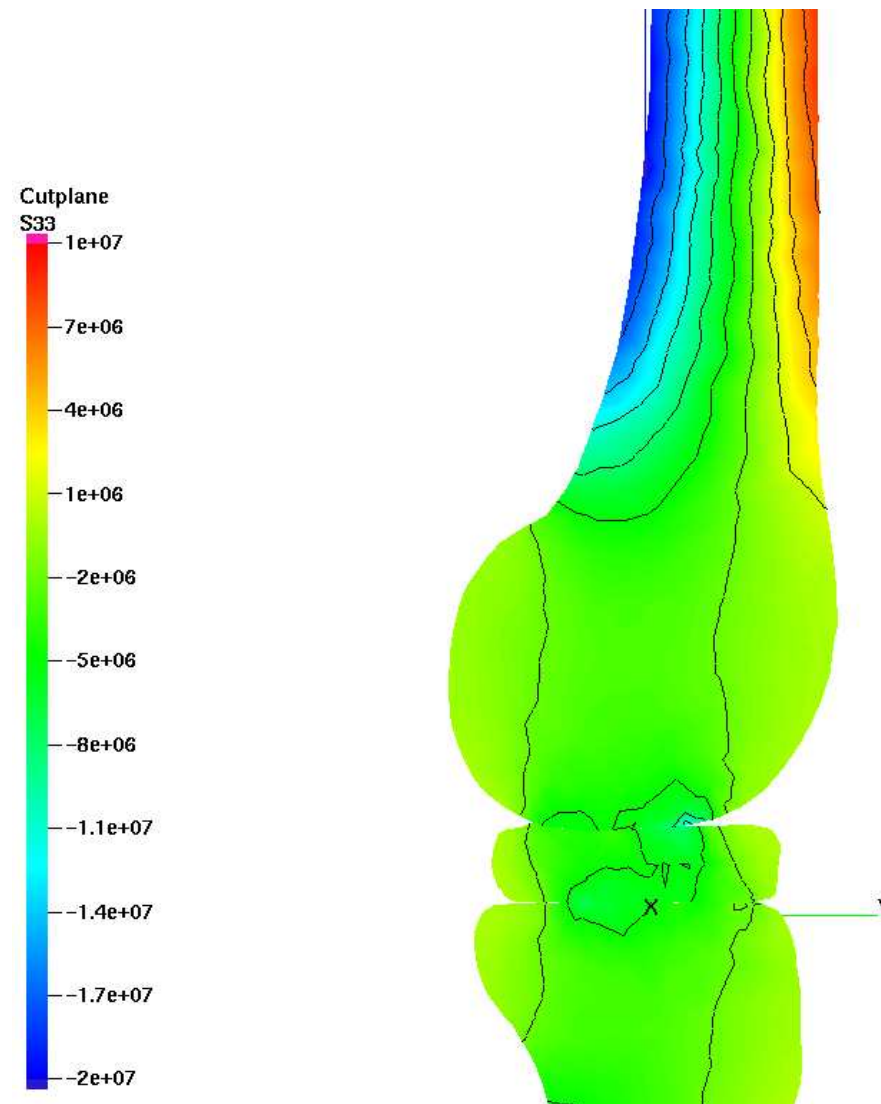
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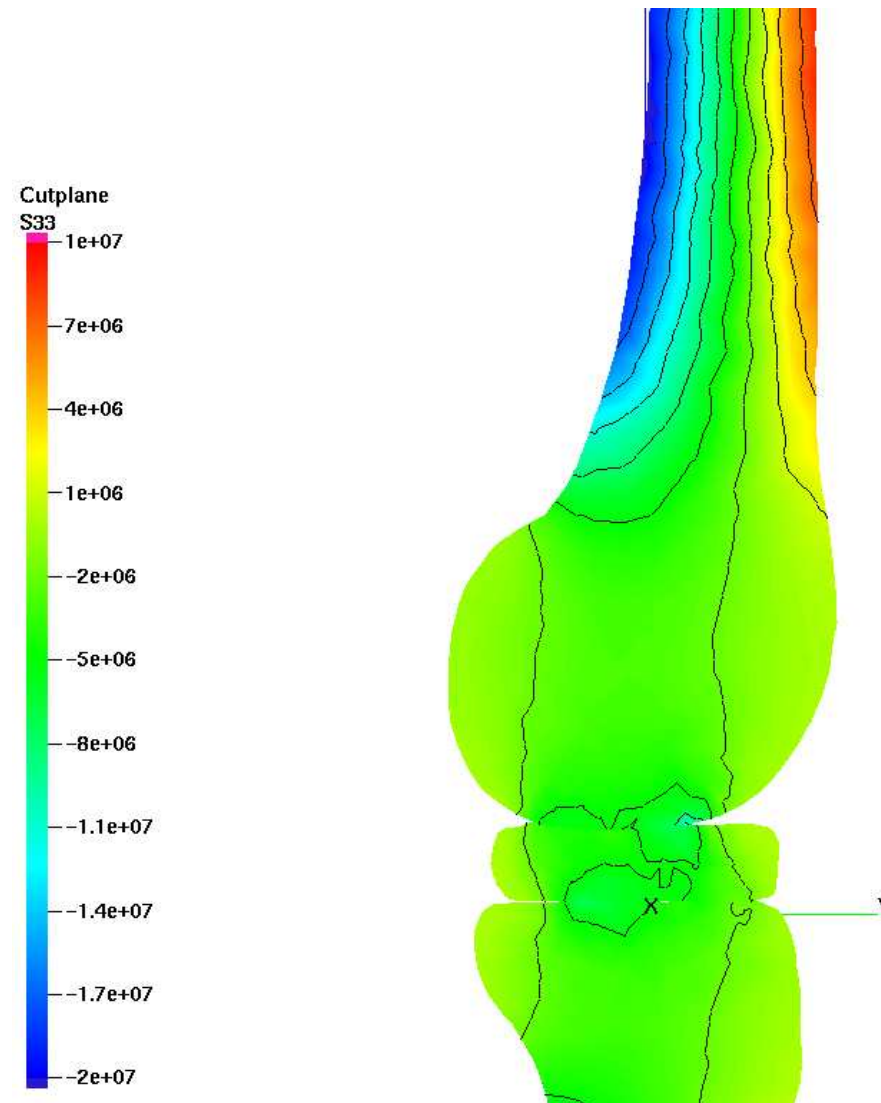
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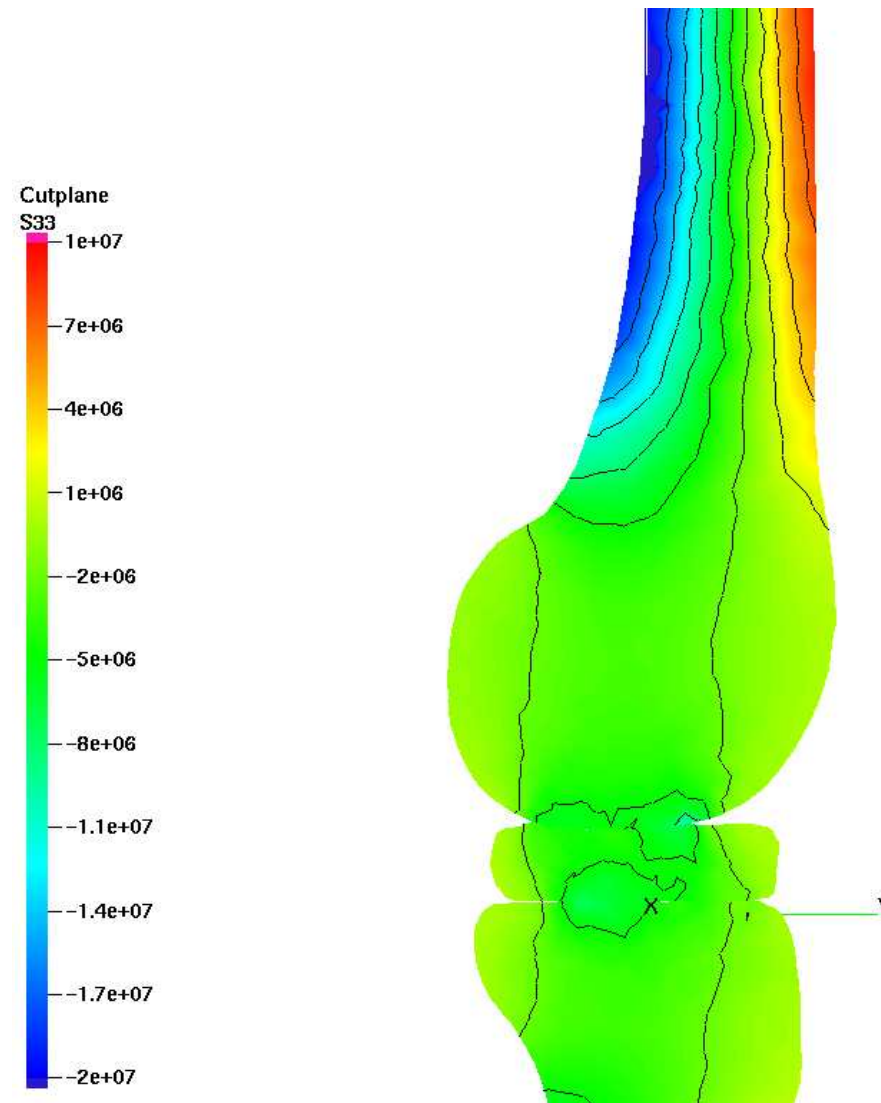
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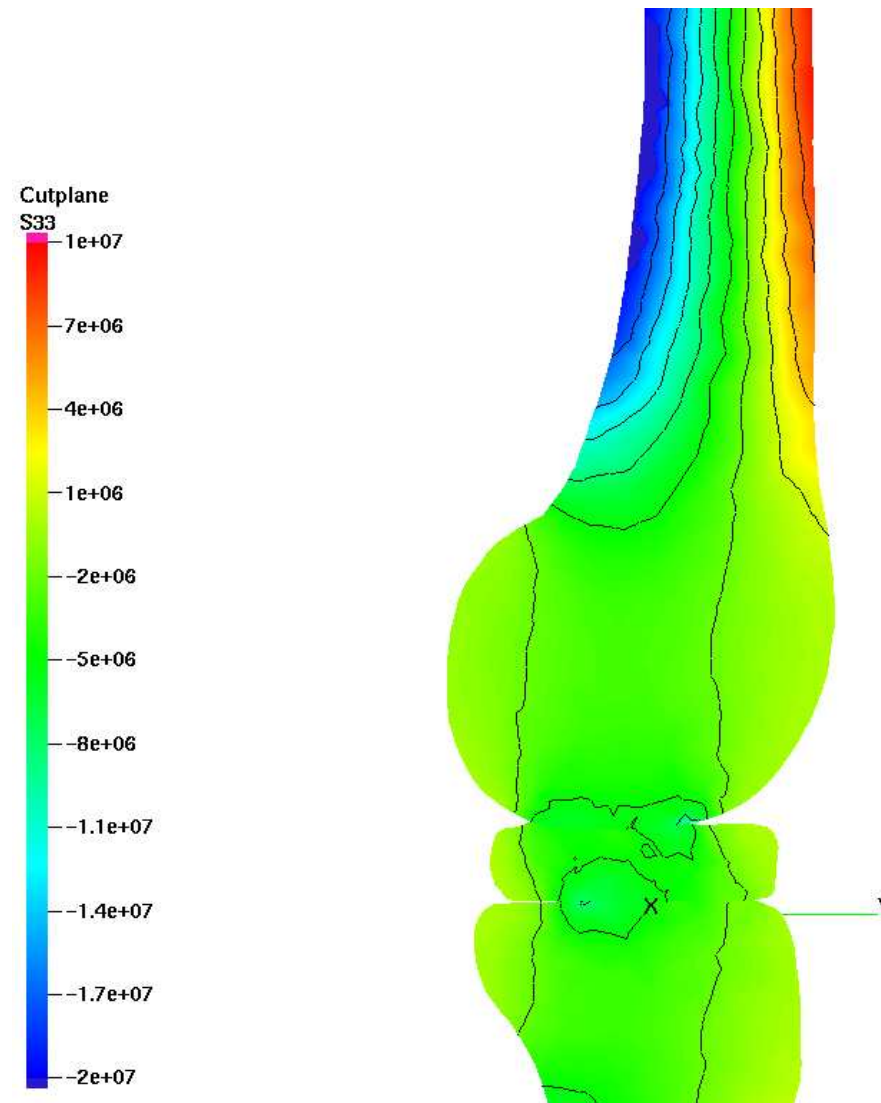
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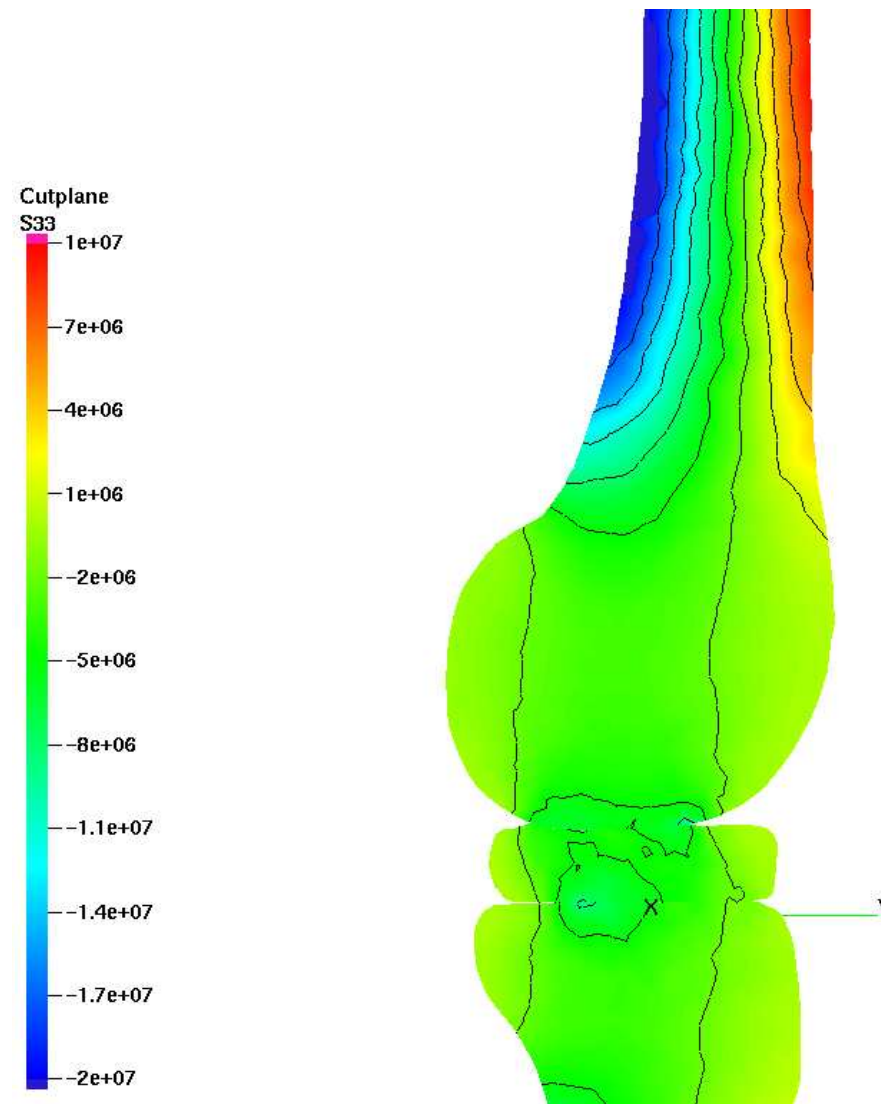
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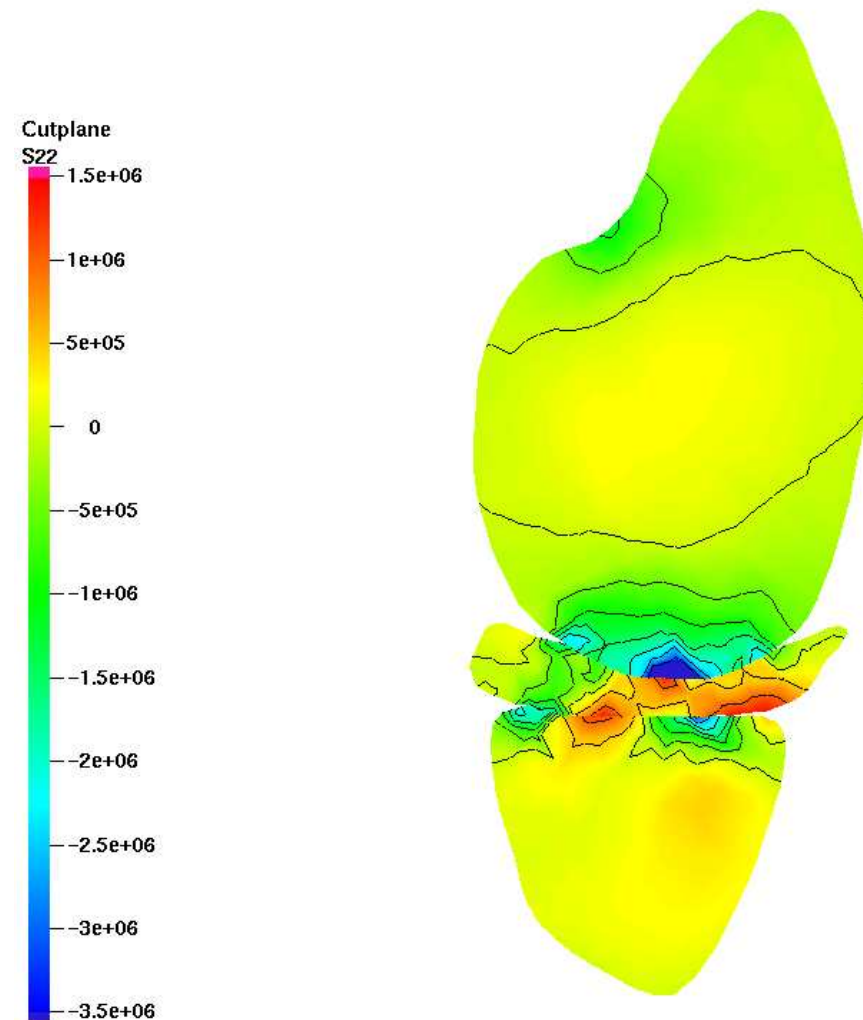
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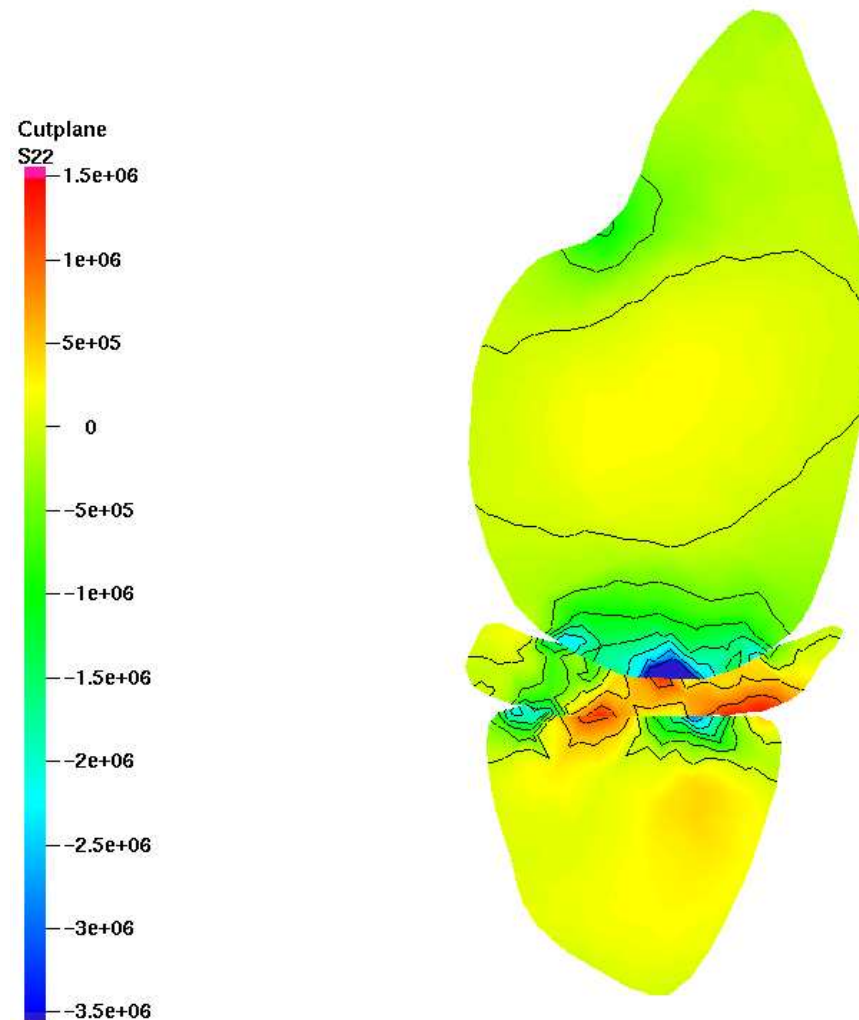
MODEL OF KNEE JOINT

component τ_{yy} of the stress tensor on inner condyl



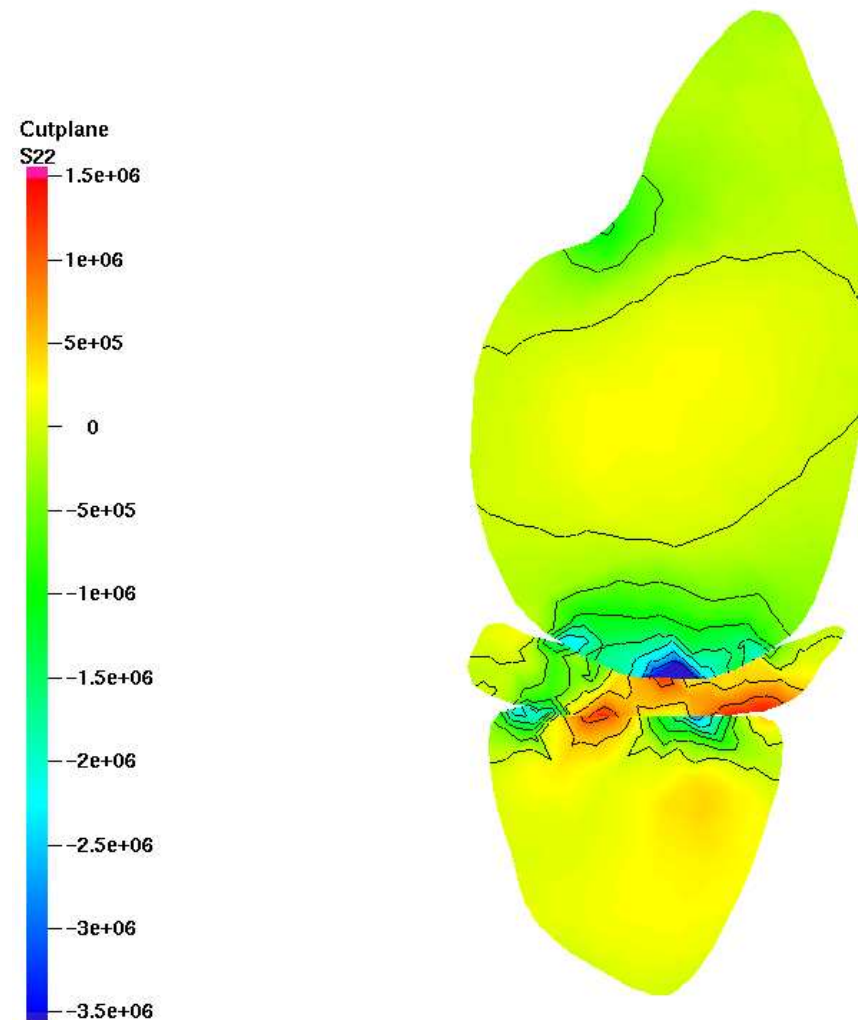
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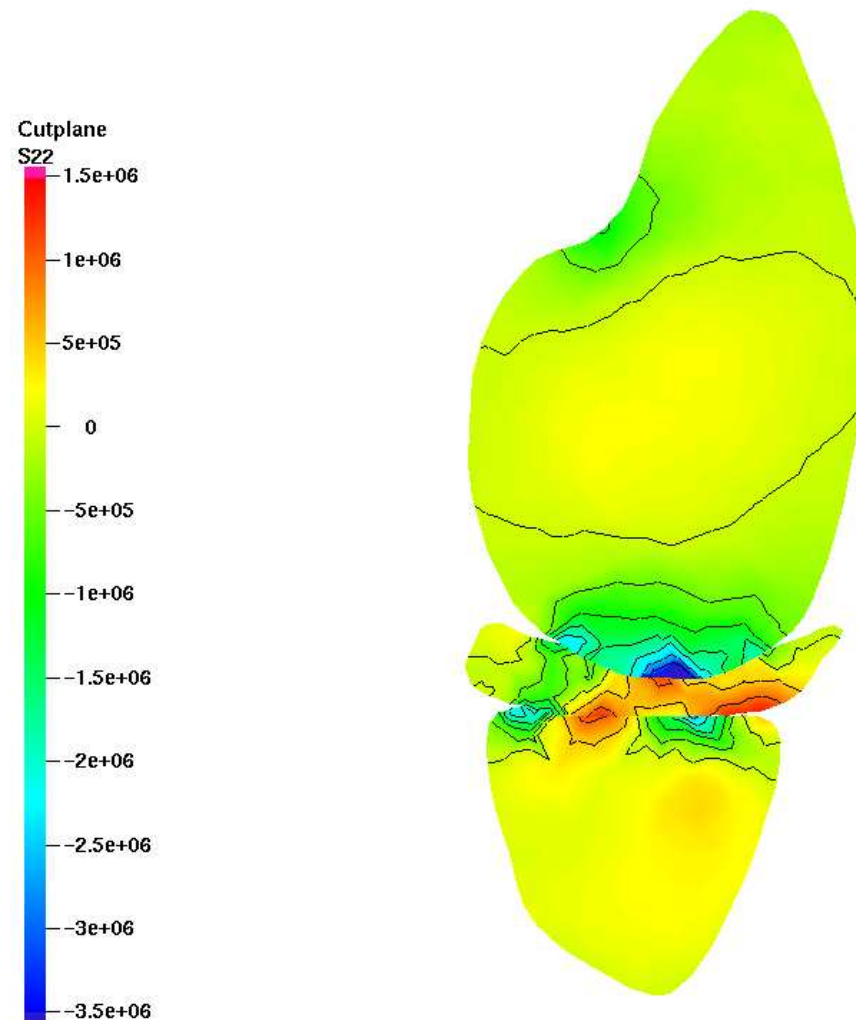
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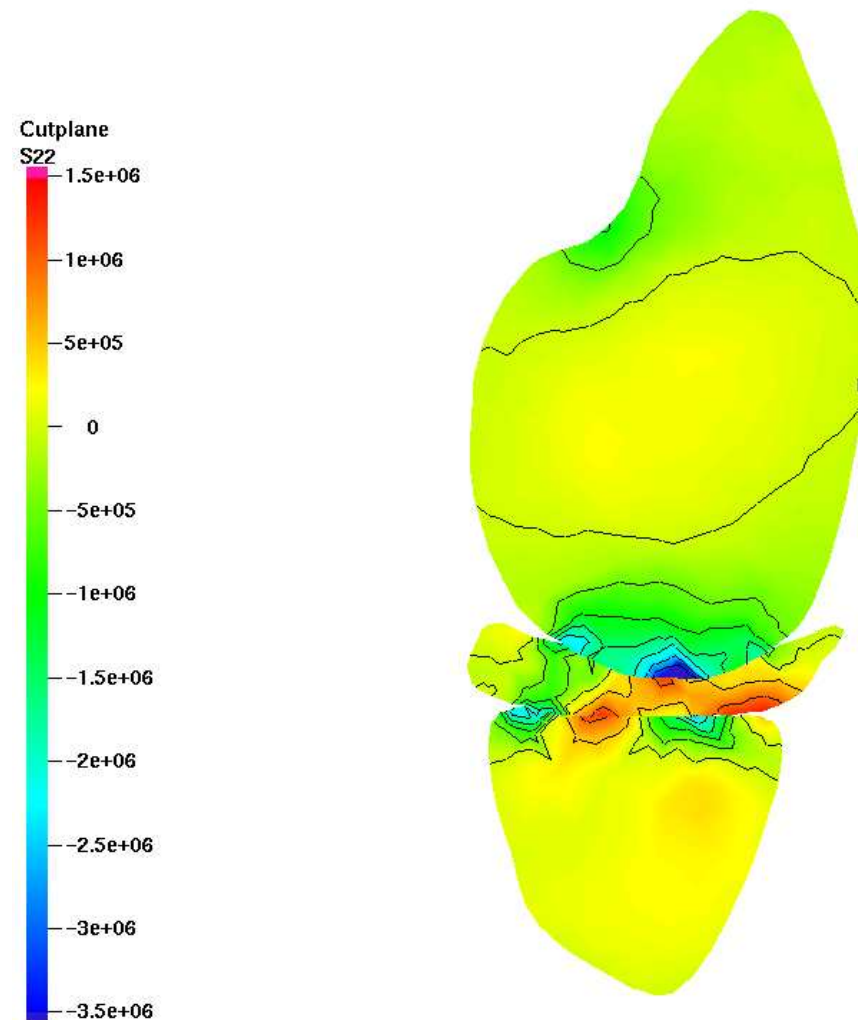
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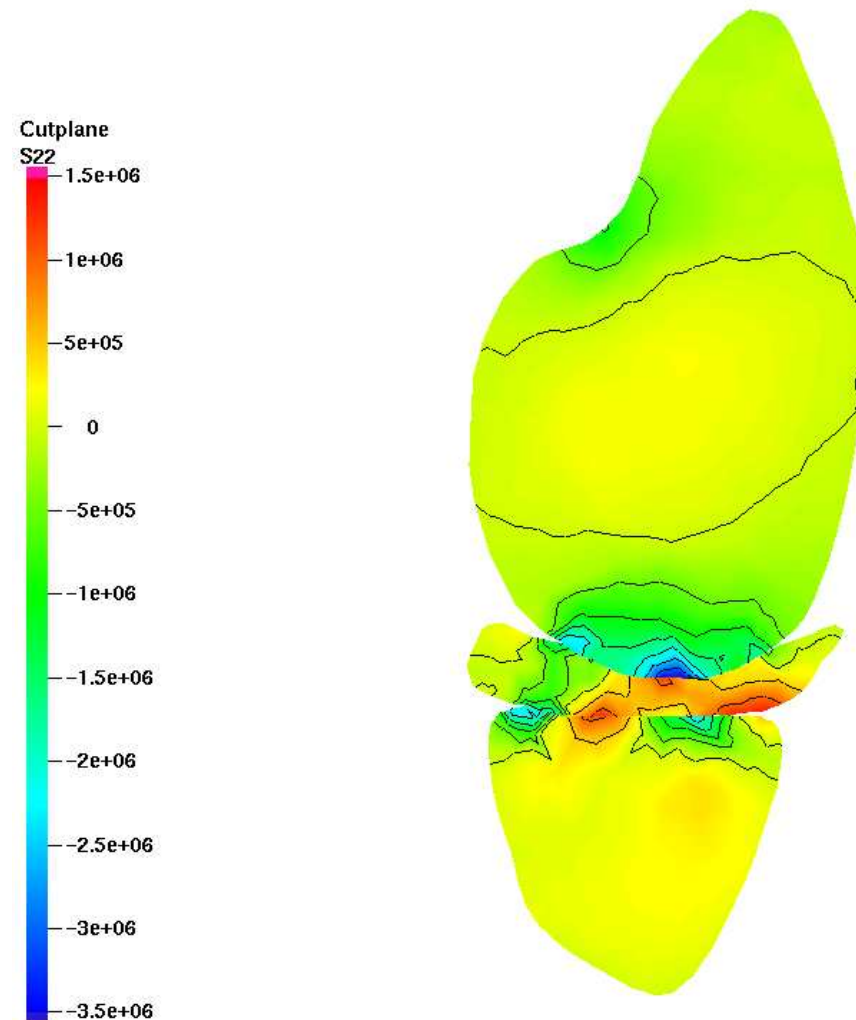
MODEL OF KNEE JOINT

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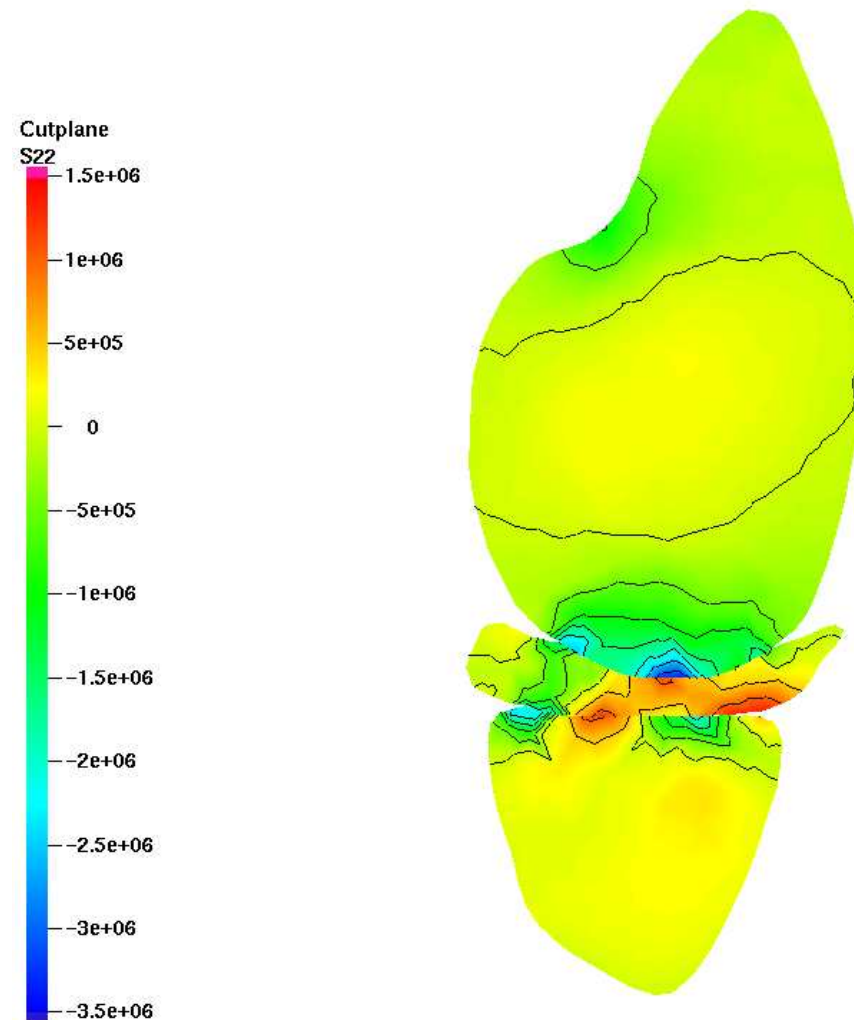
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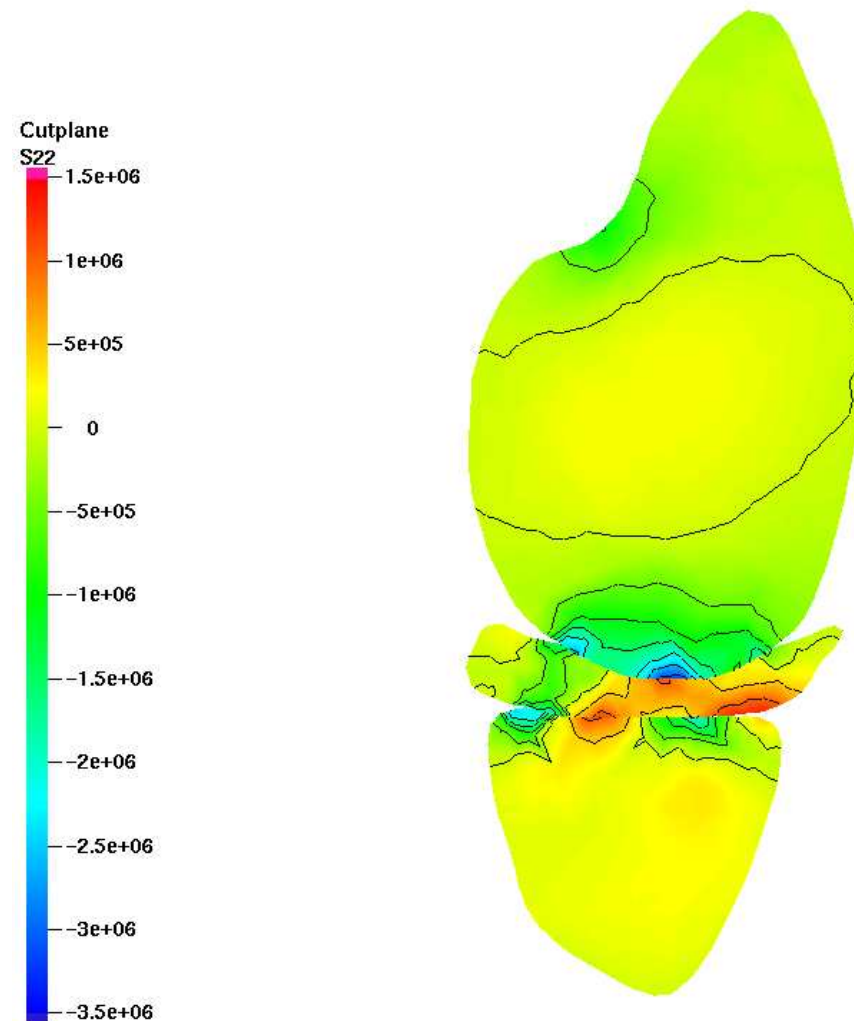
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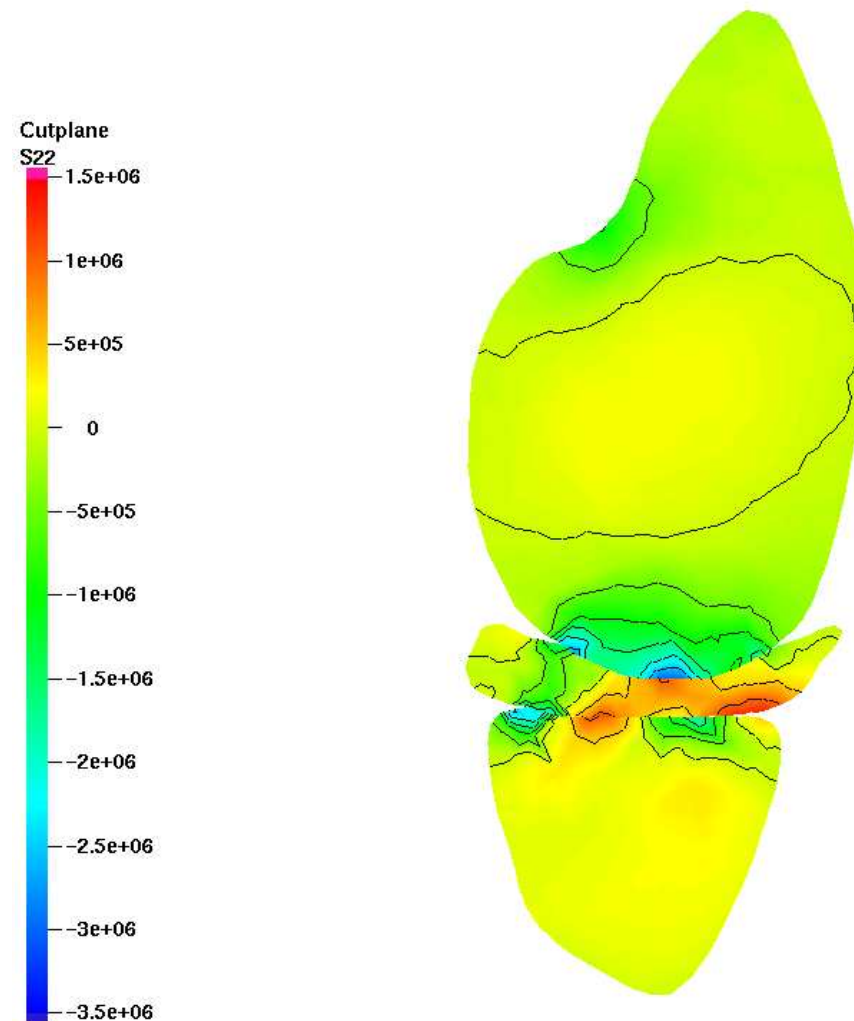
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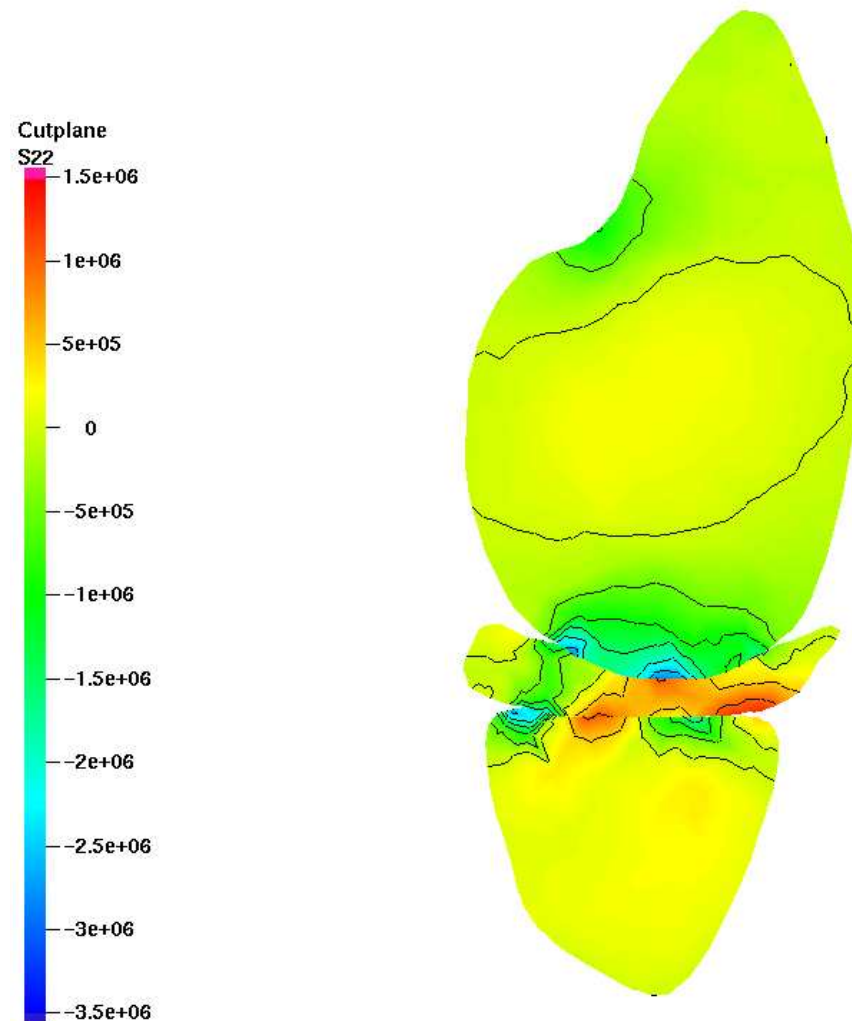
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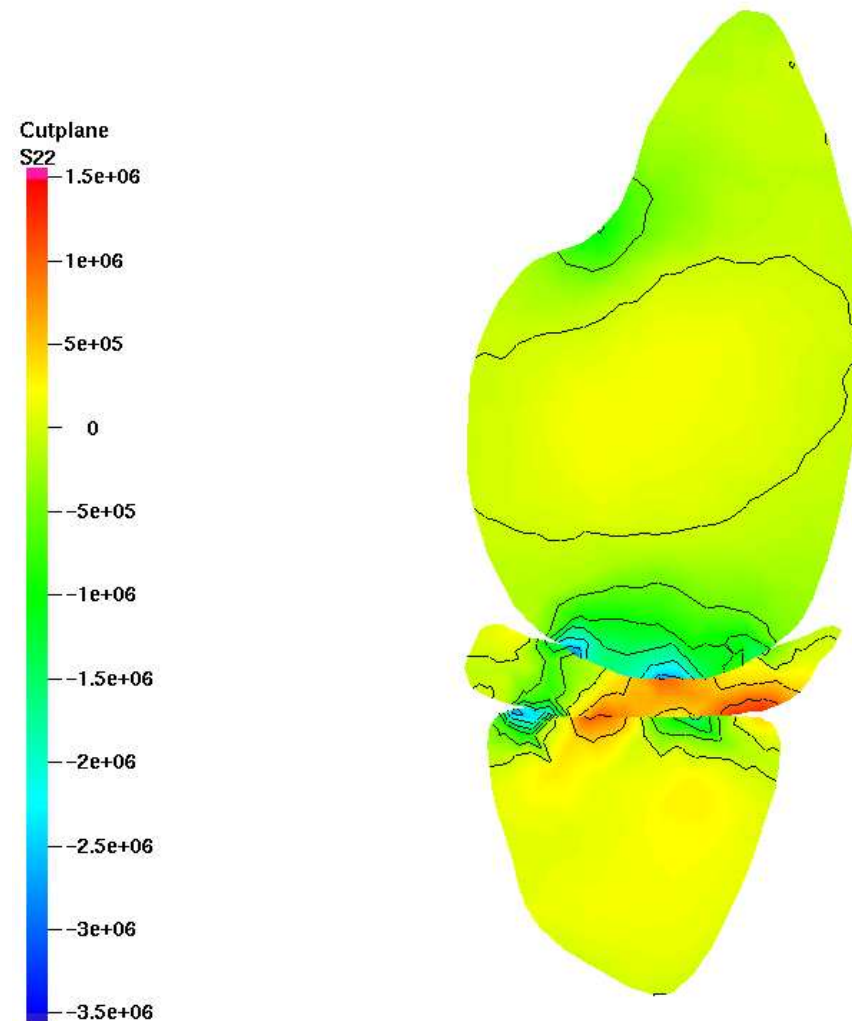
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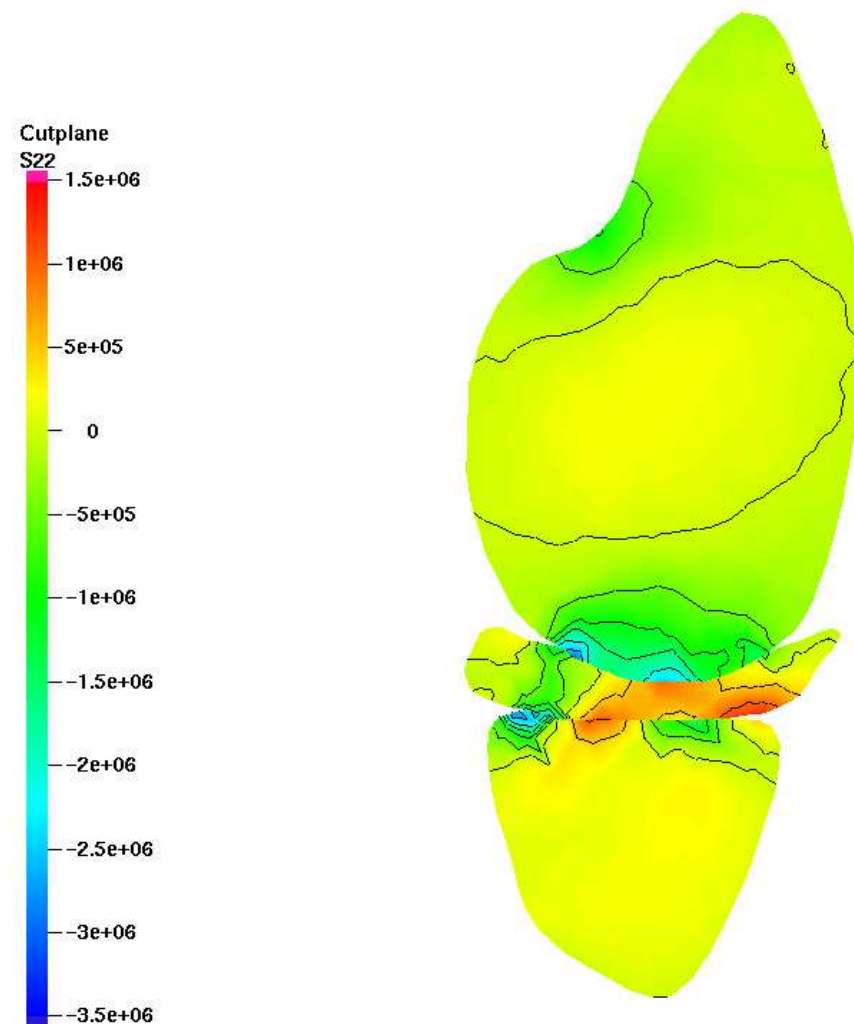
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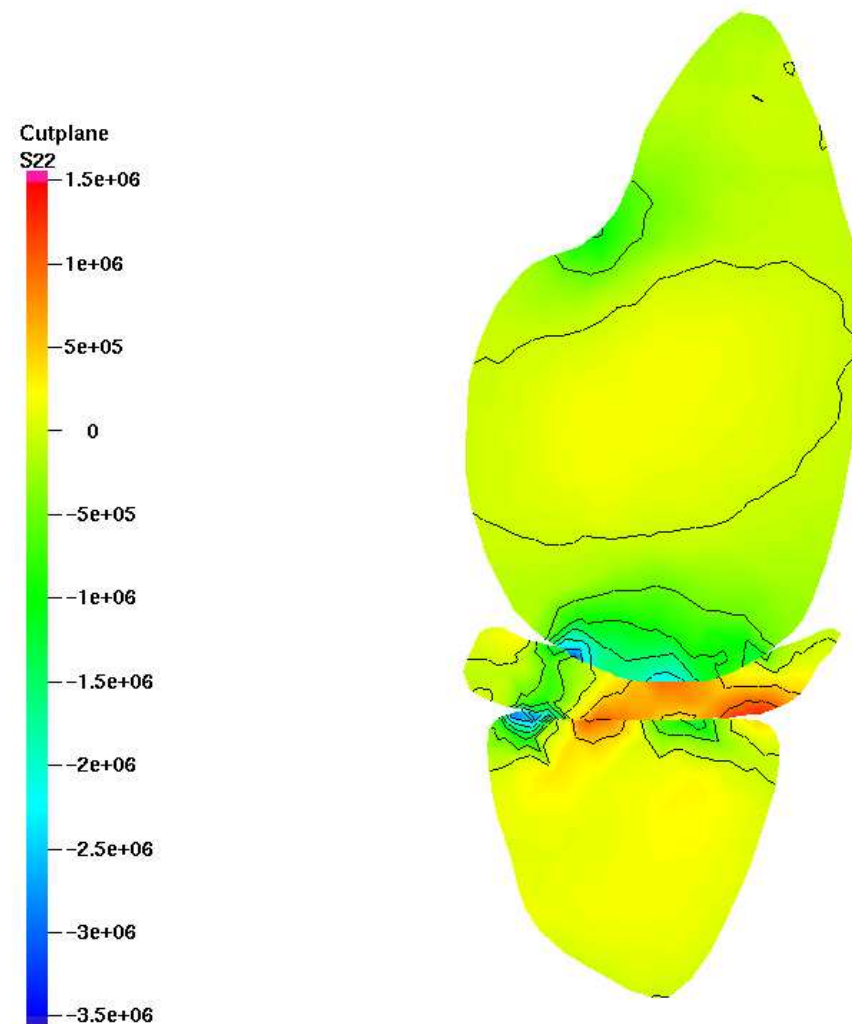
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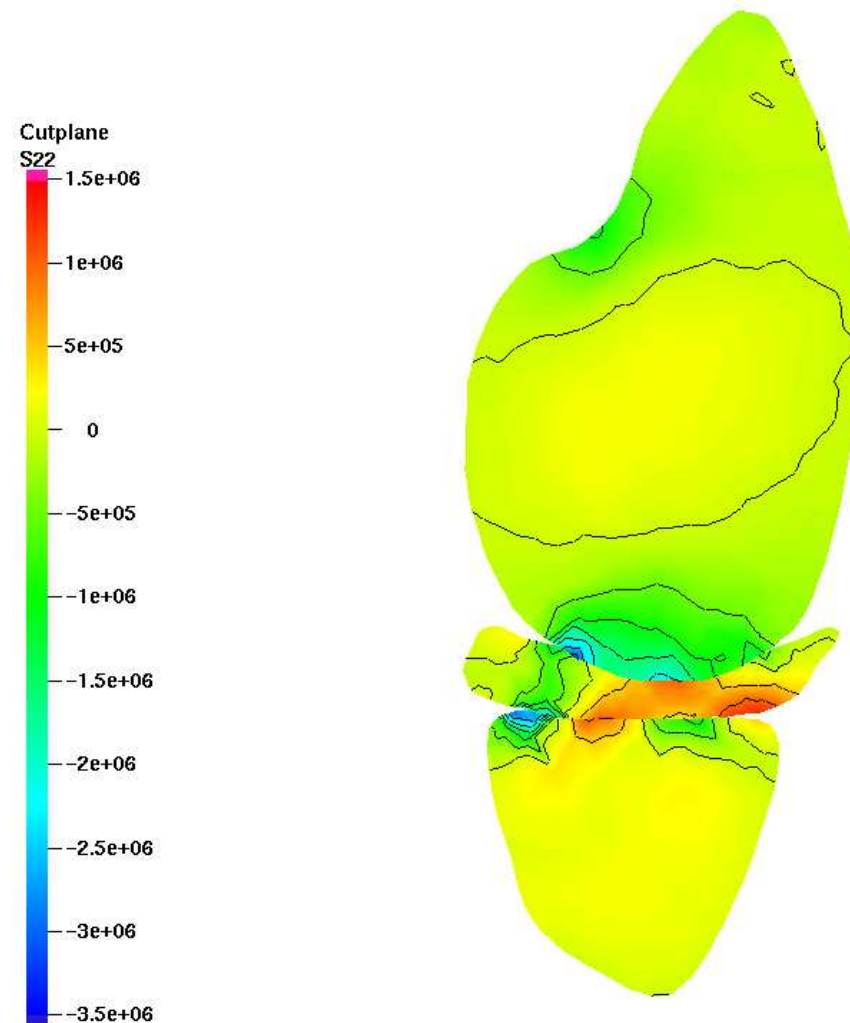
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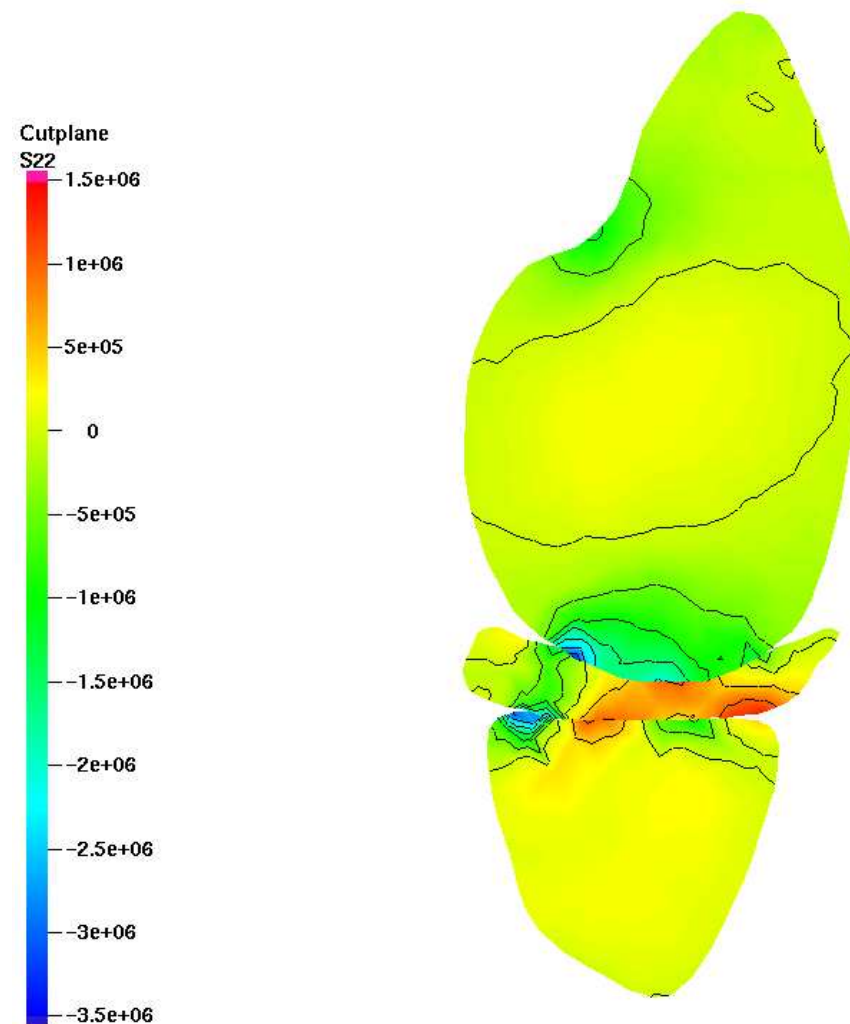
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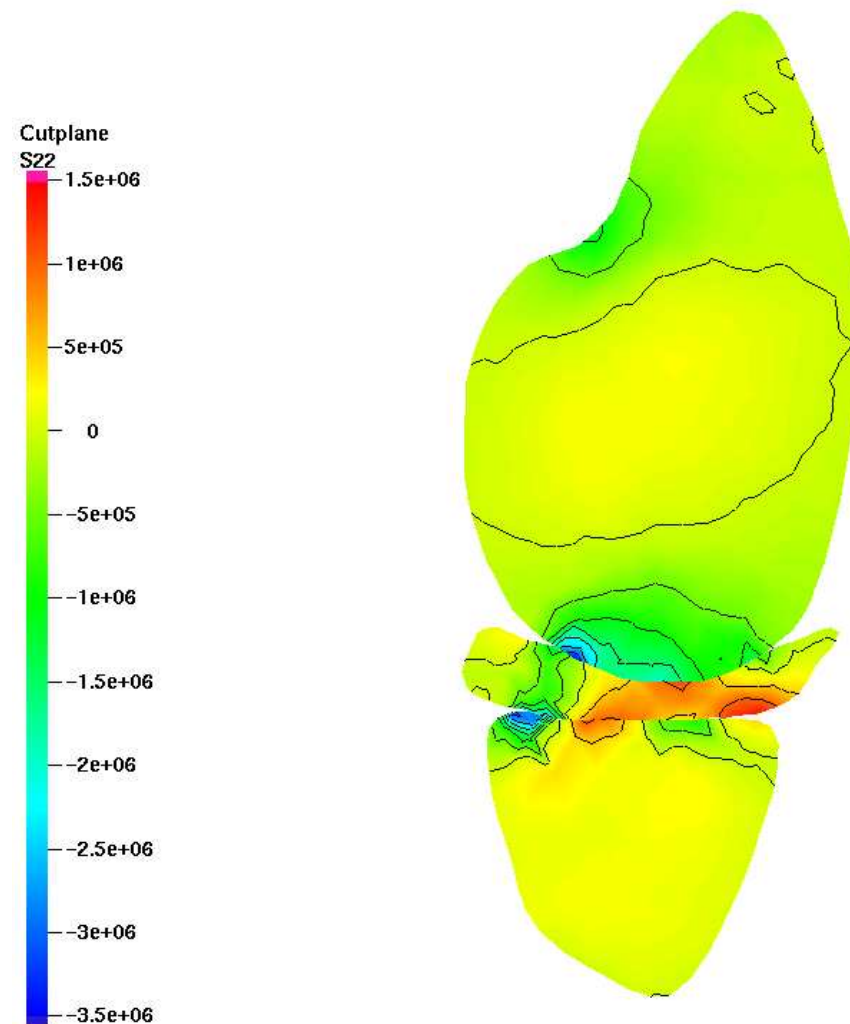
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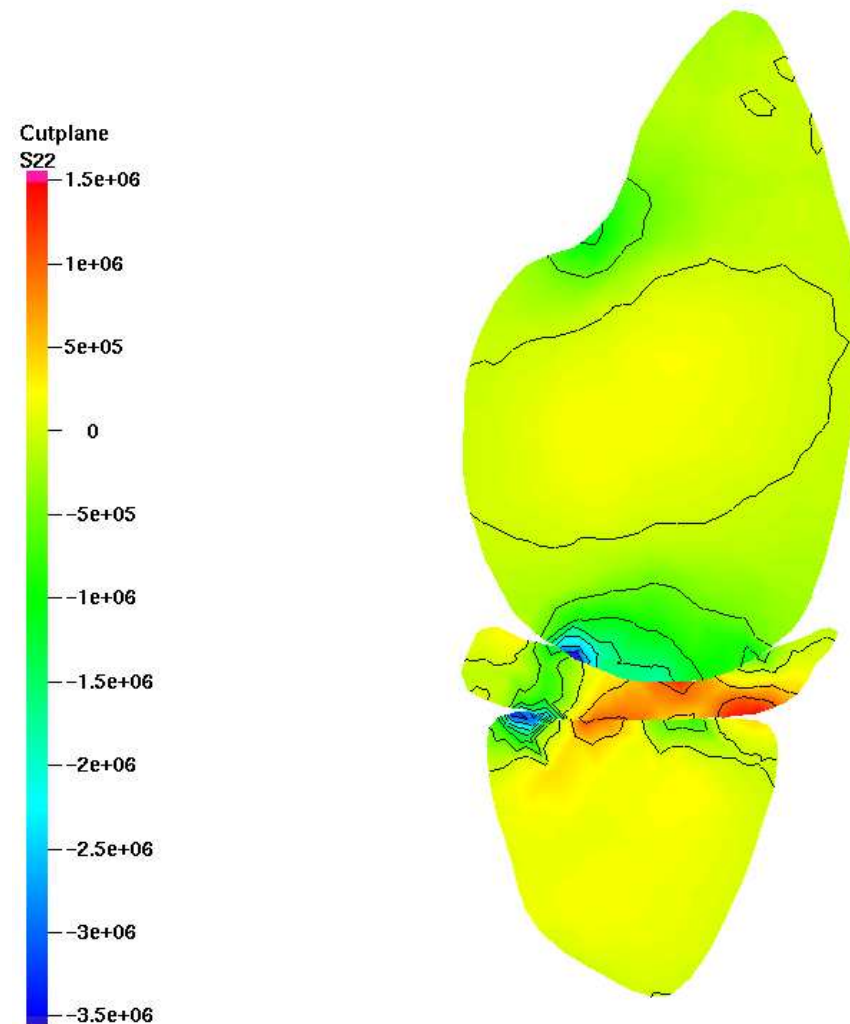
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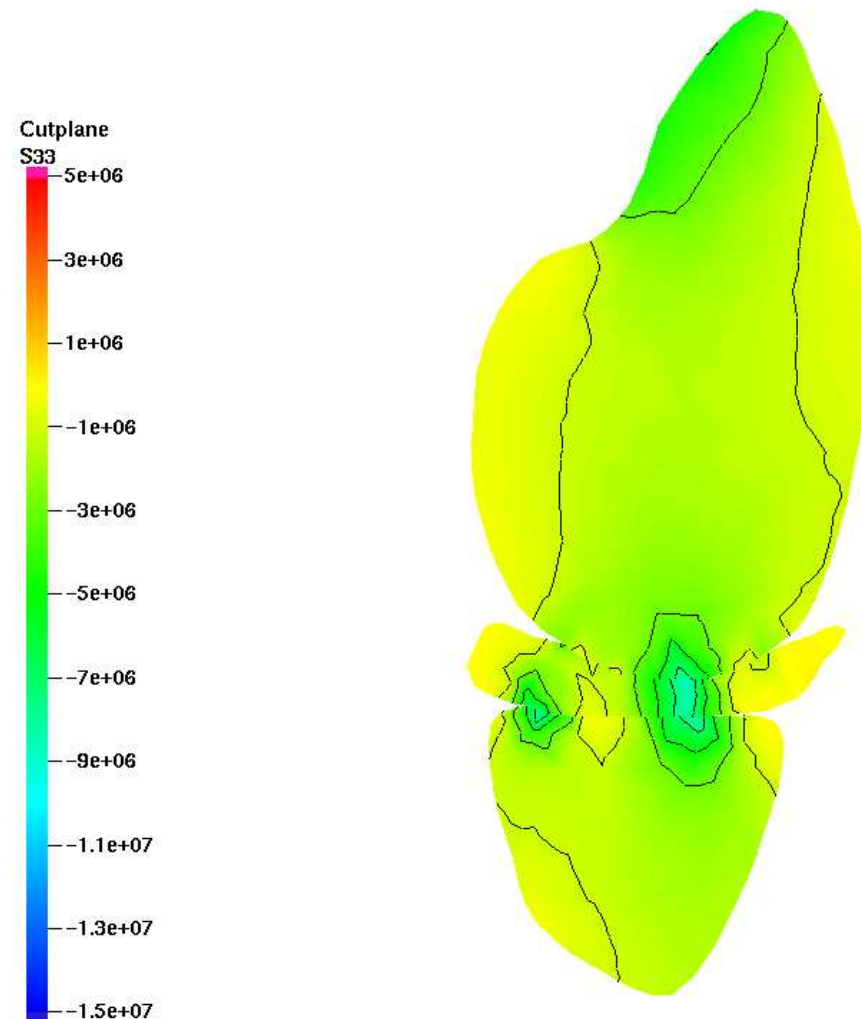
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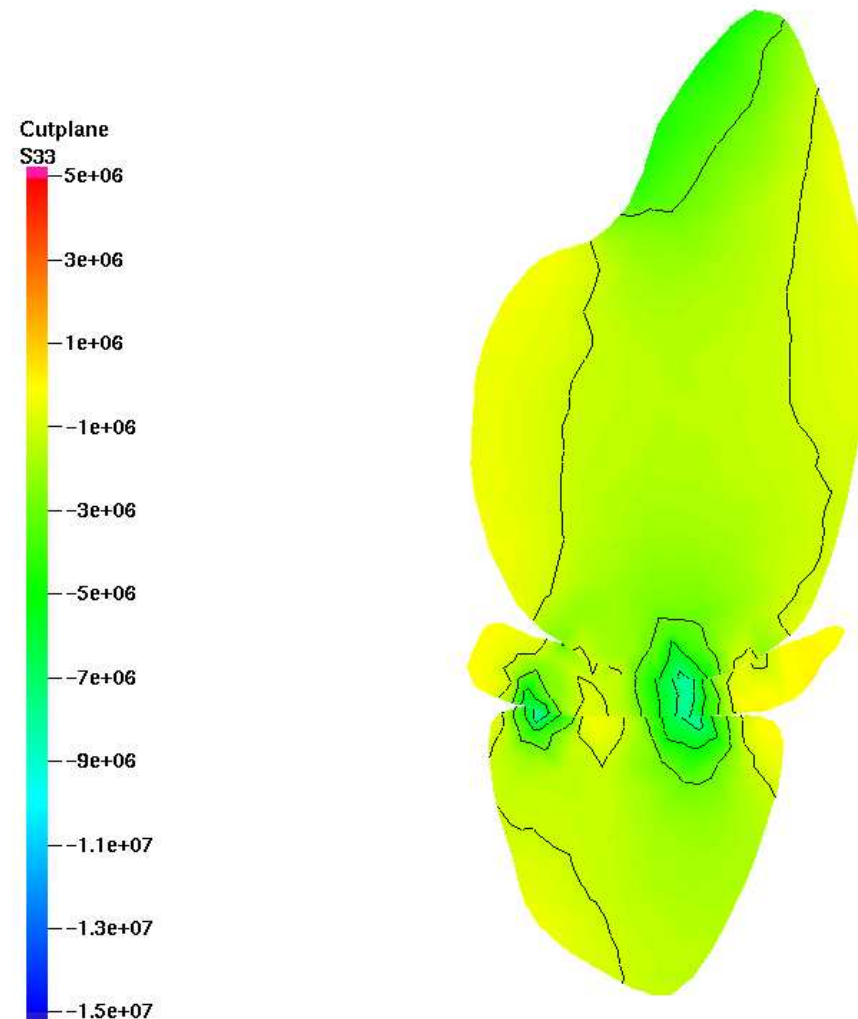
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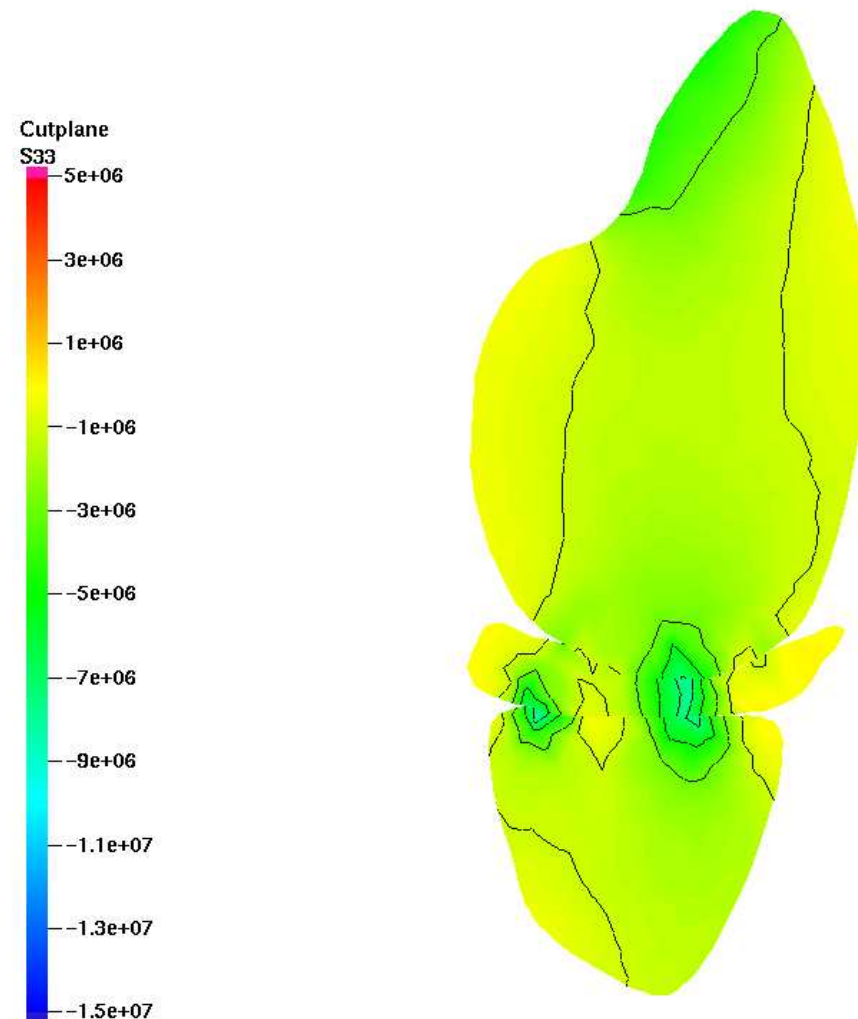
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



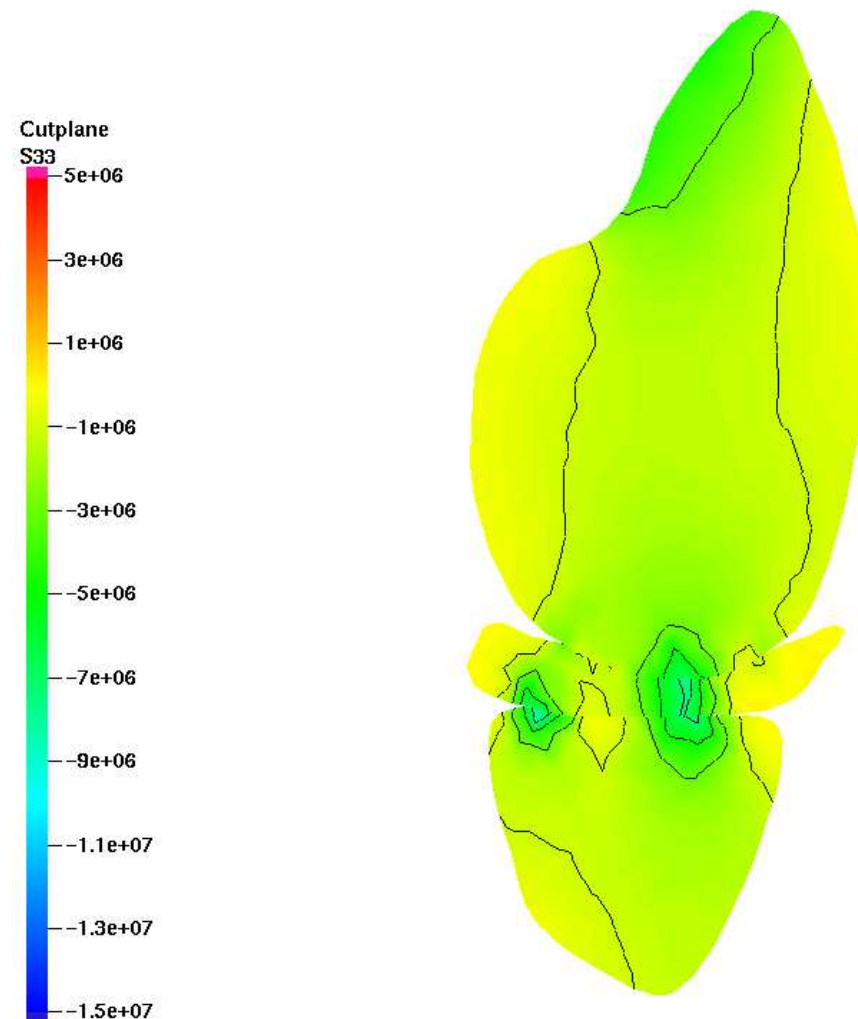
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



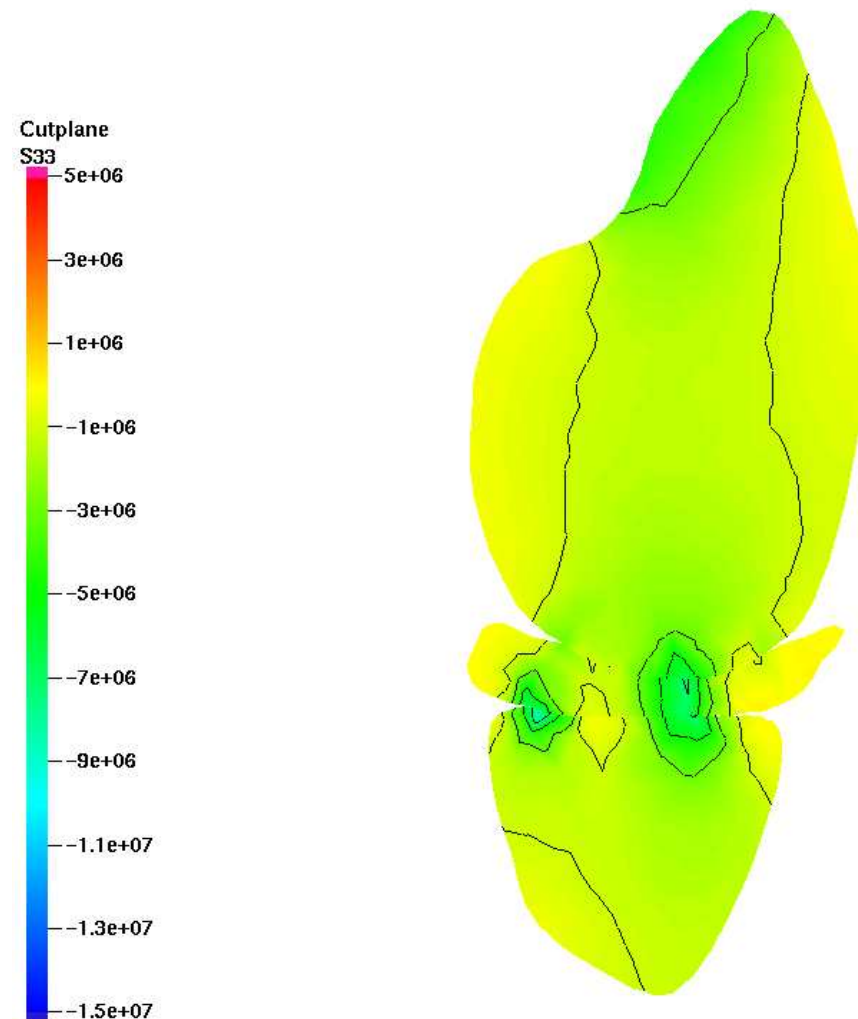
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



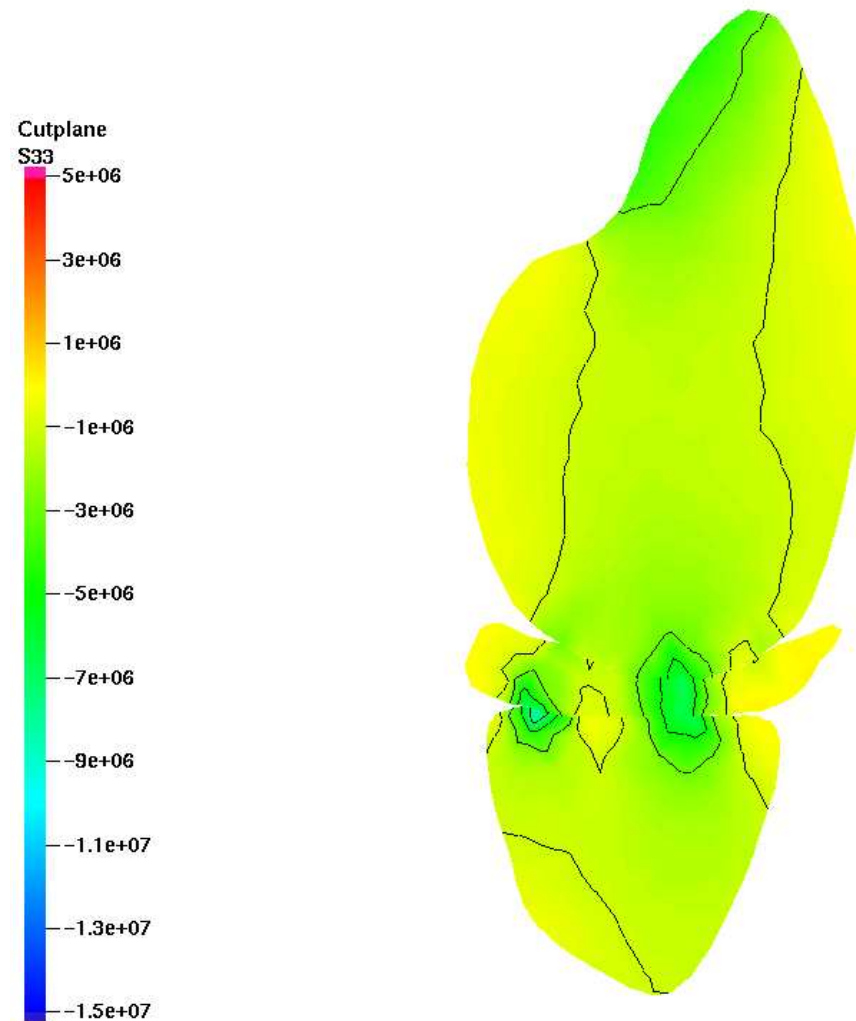
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



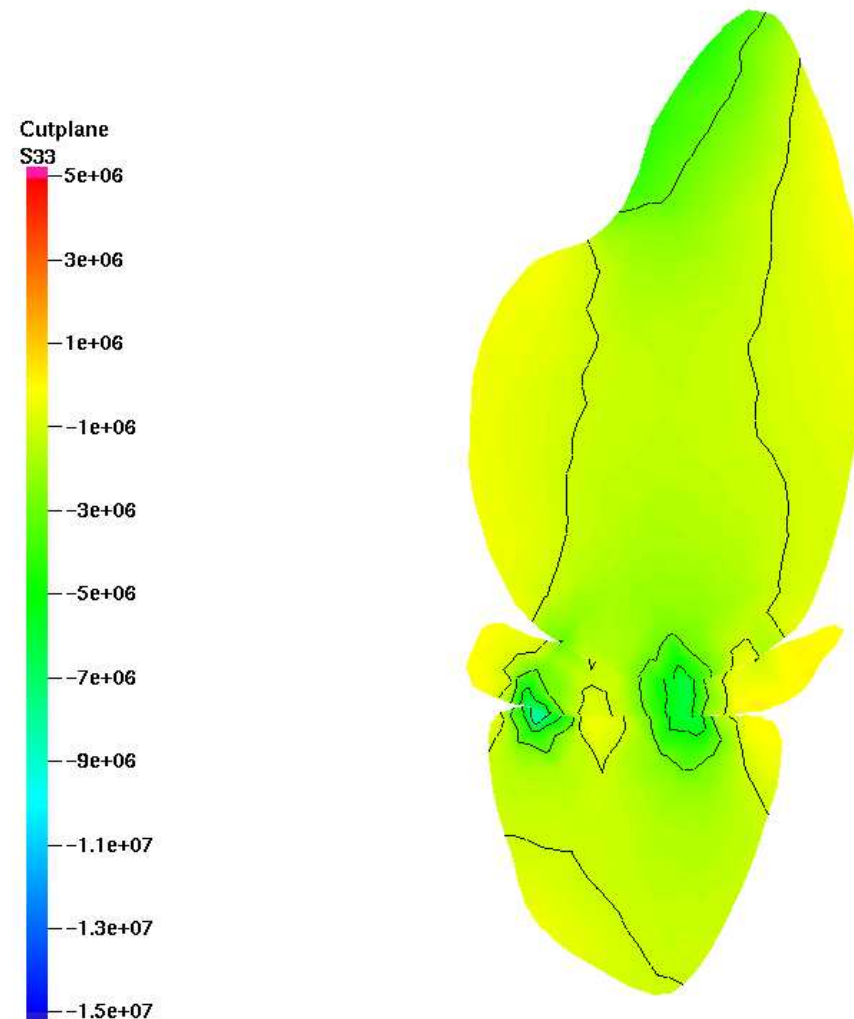
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



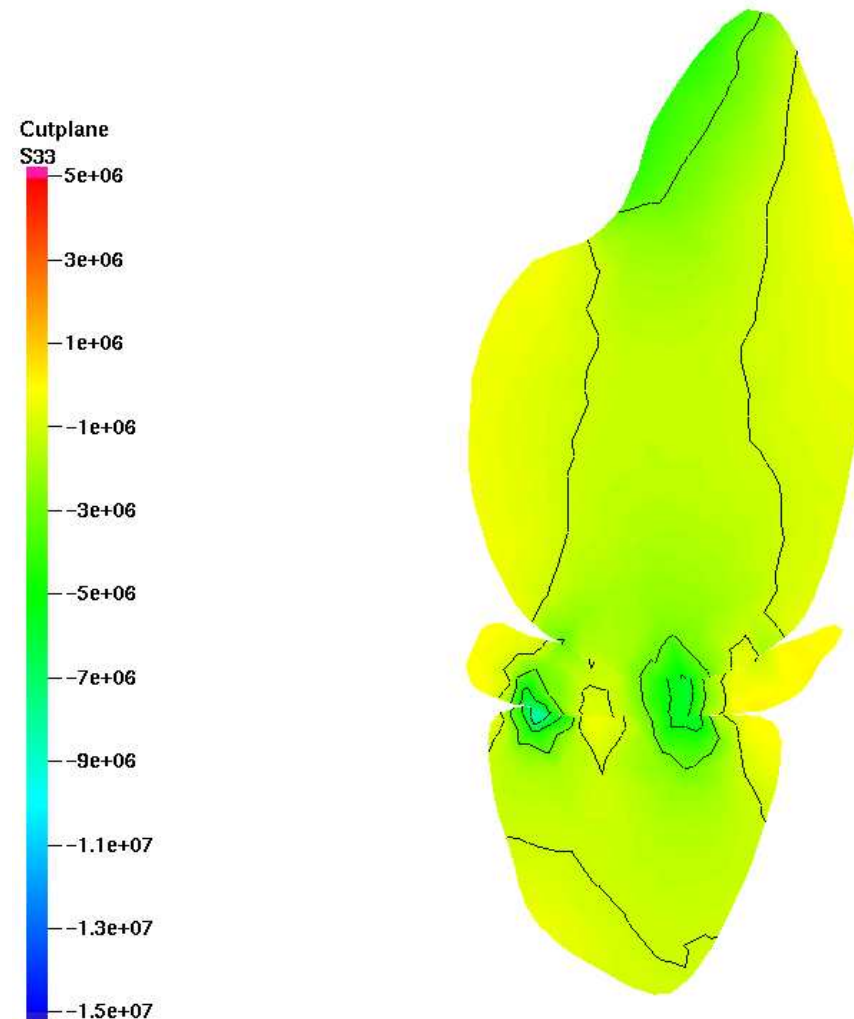
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



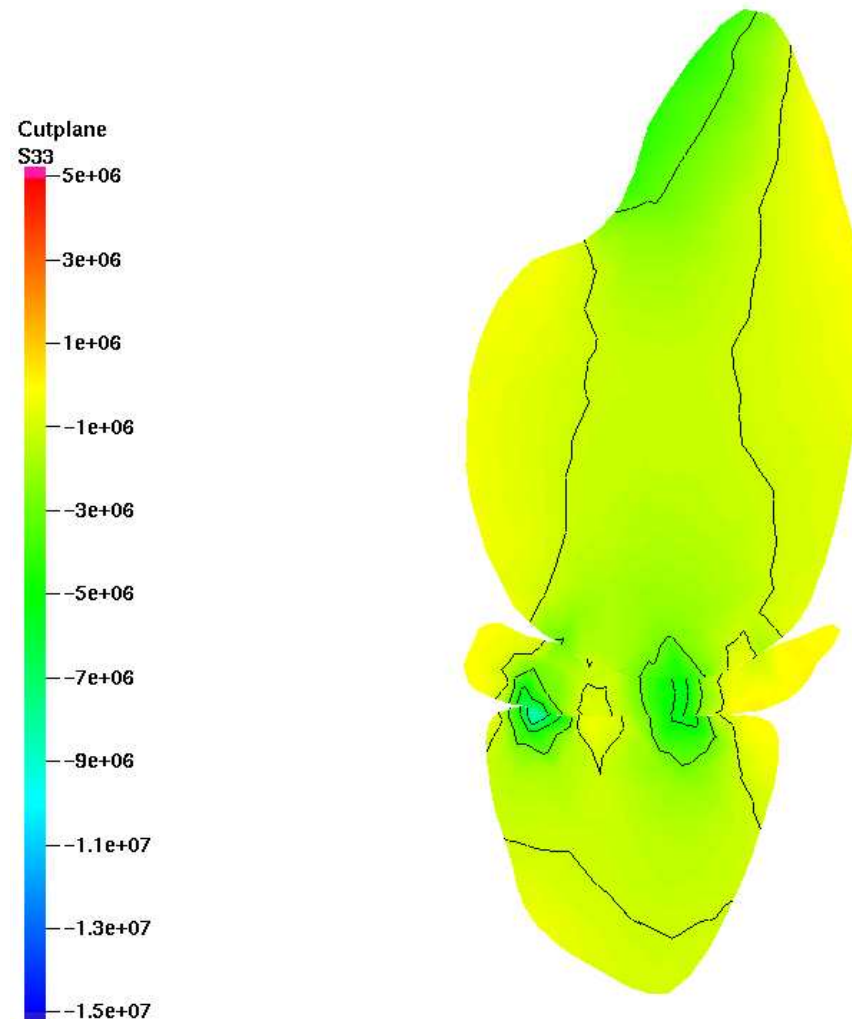
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



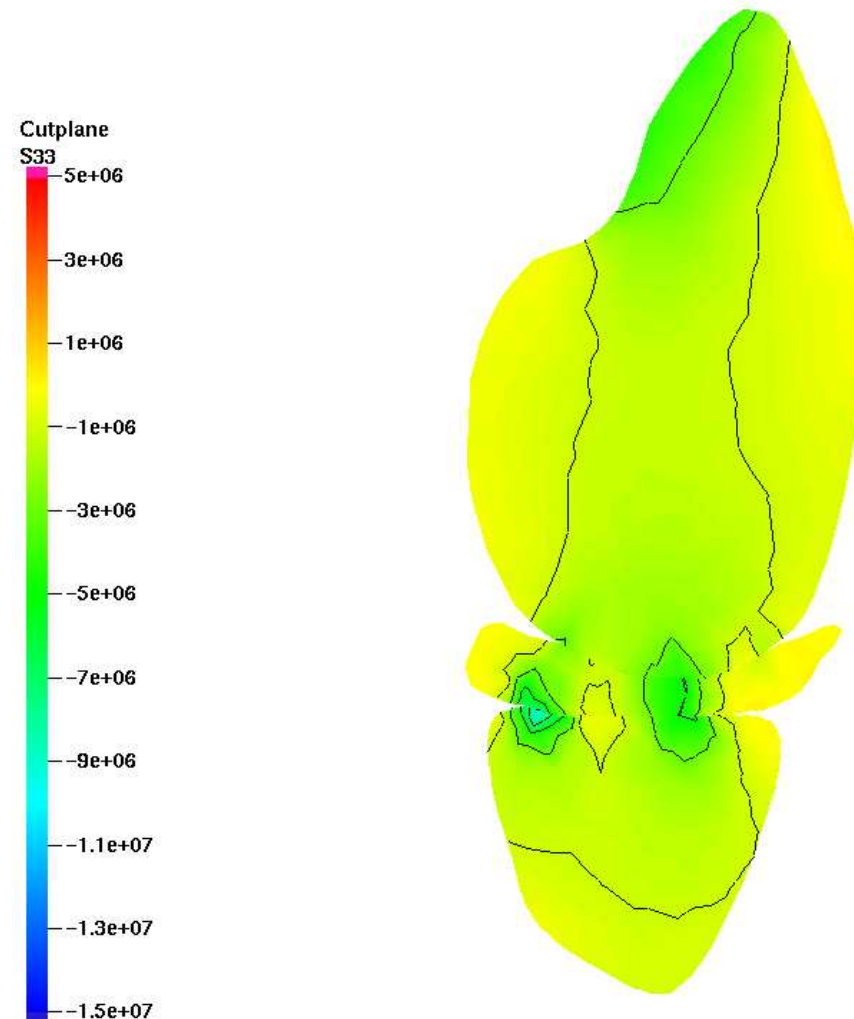
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



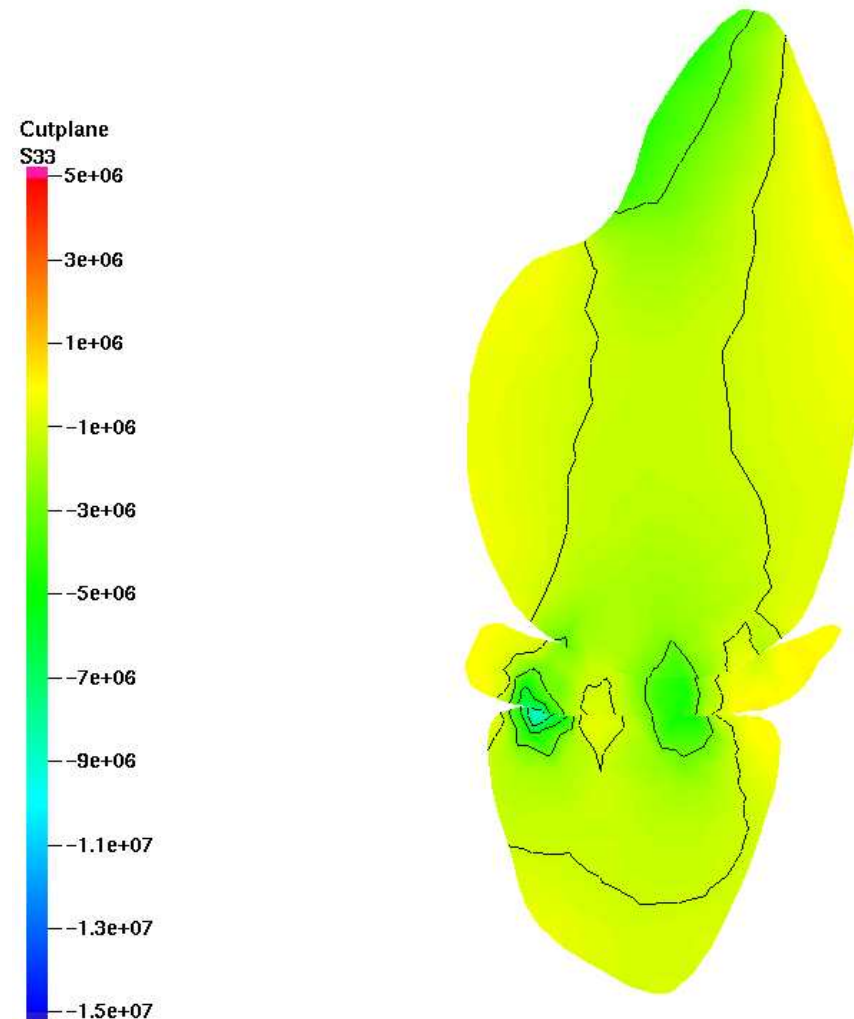
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



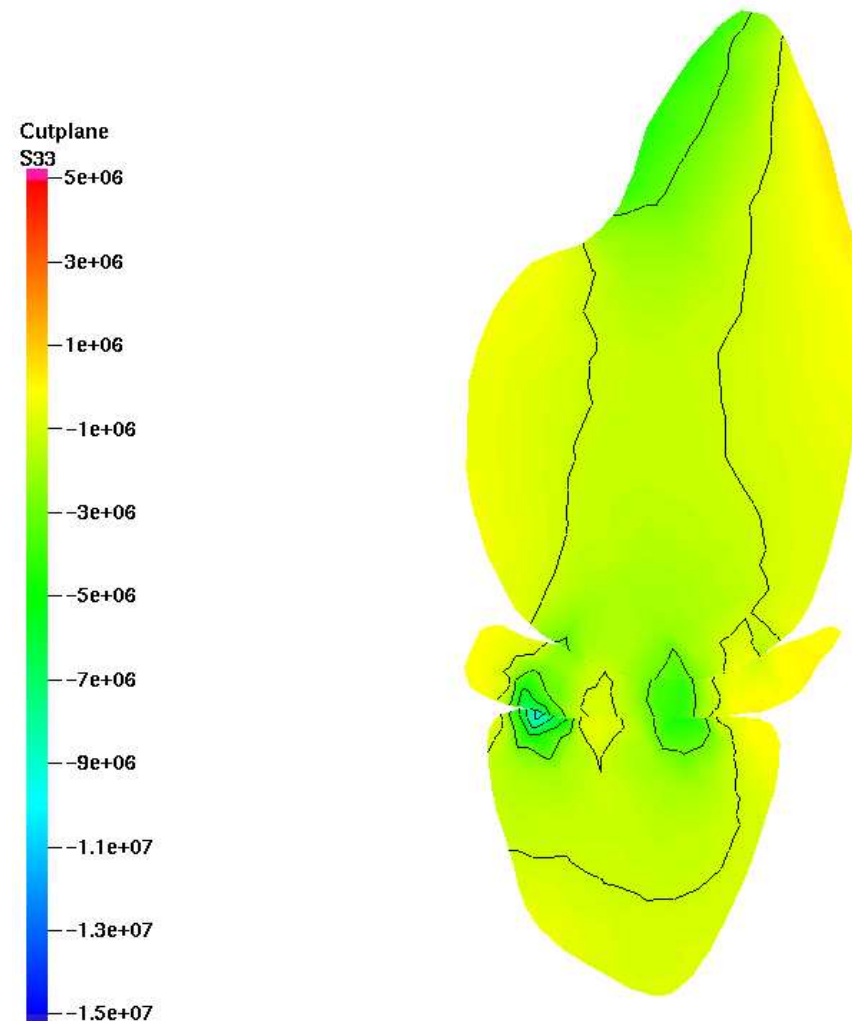
MODEL OF KNEE JOINT

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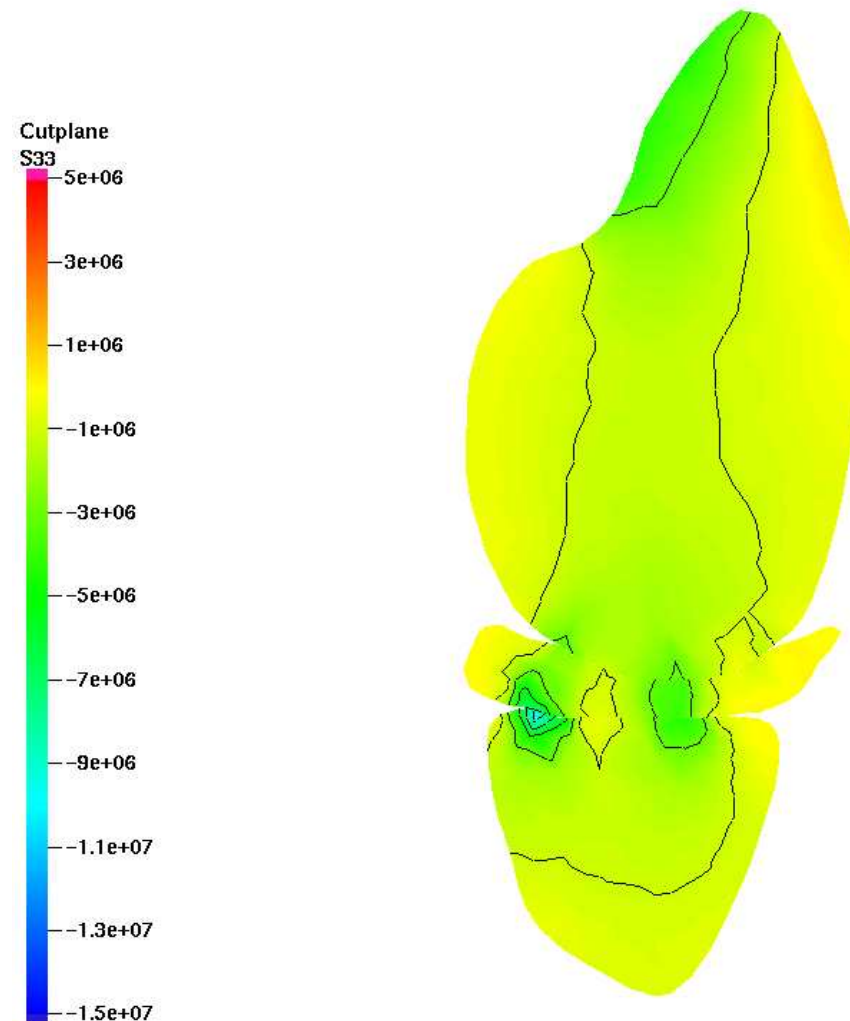
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



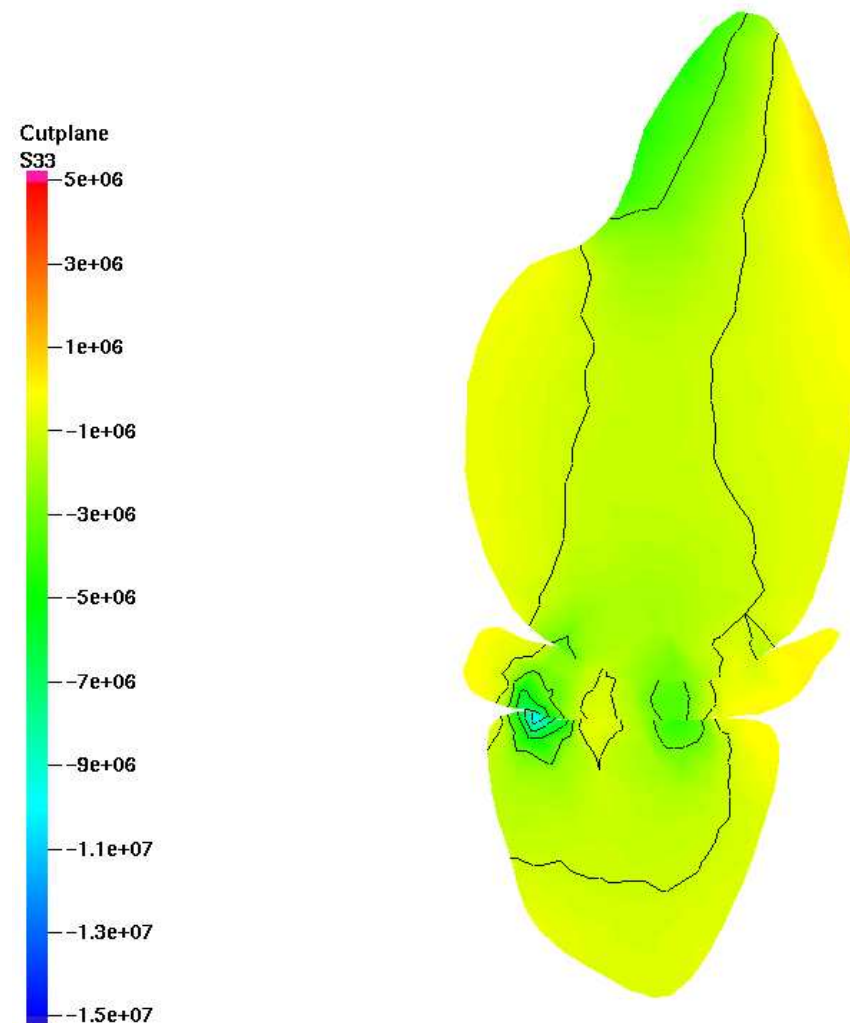
MODEL OF KNEE JOINT

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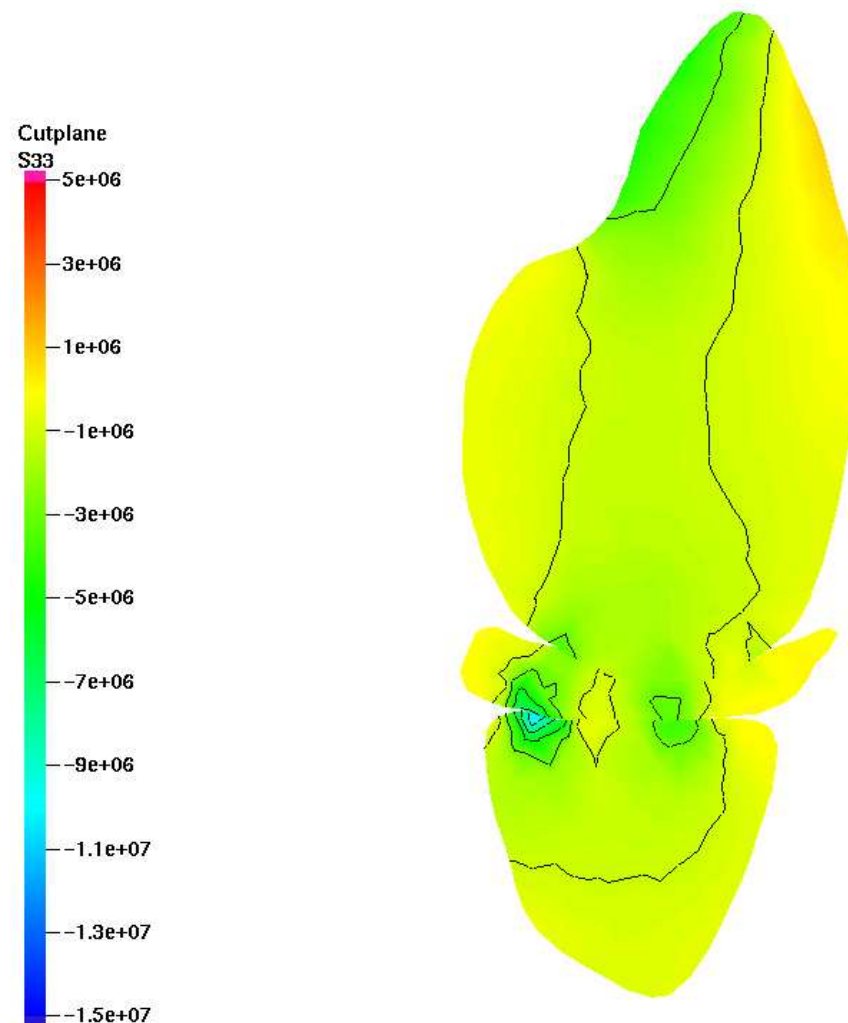
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



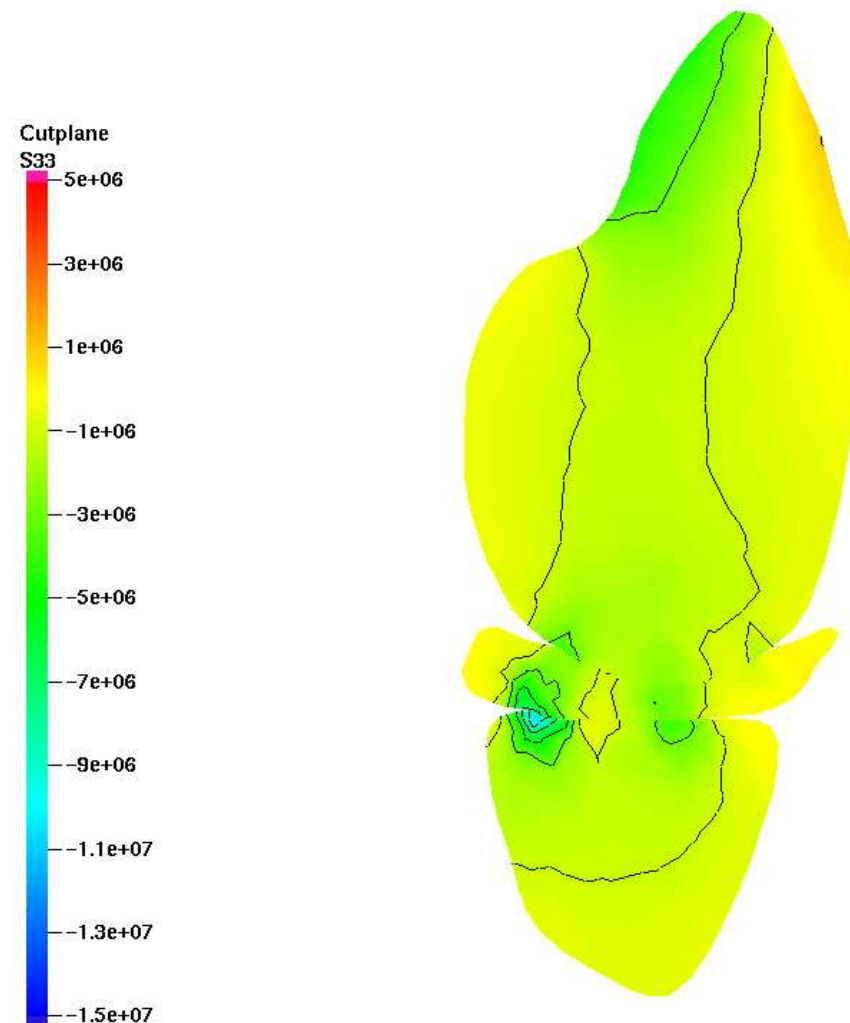
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



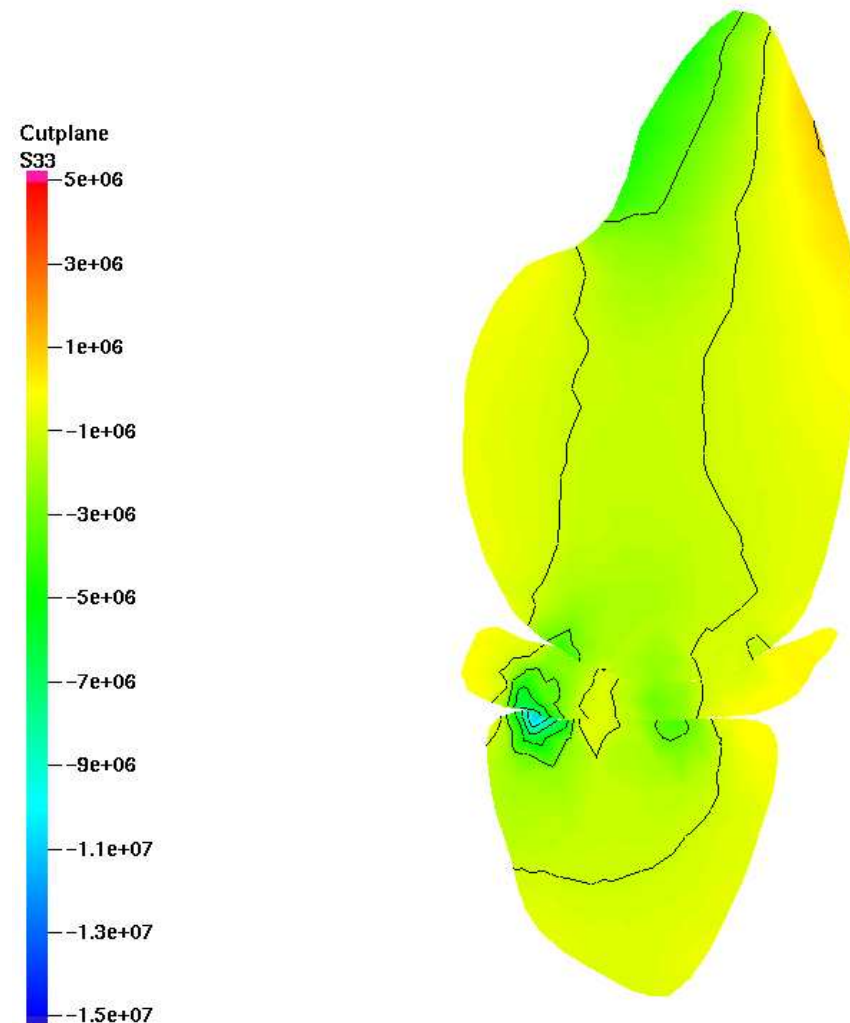
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



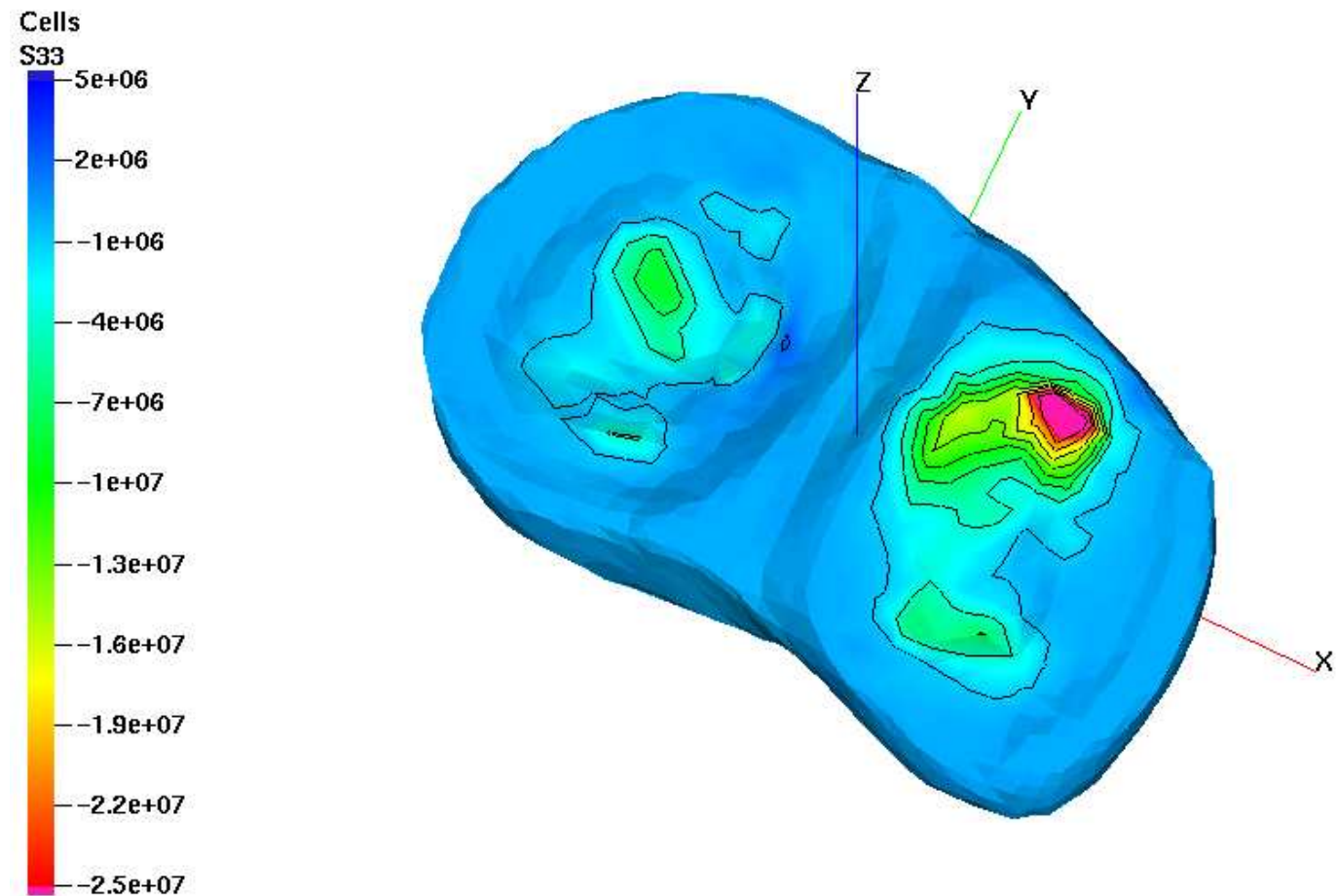
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on inner condyl



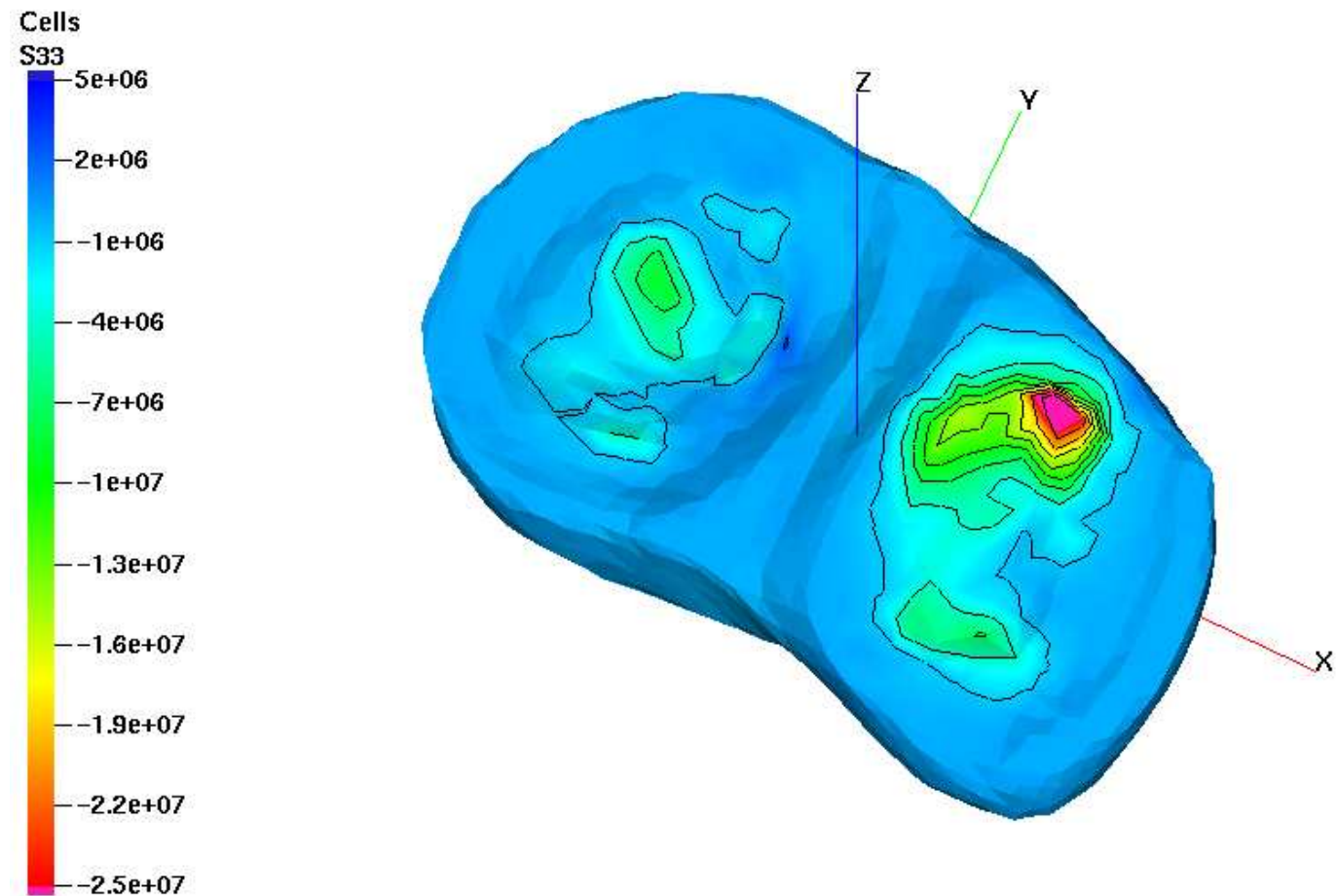
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



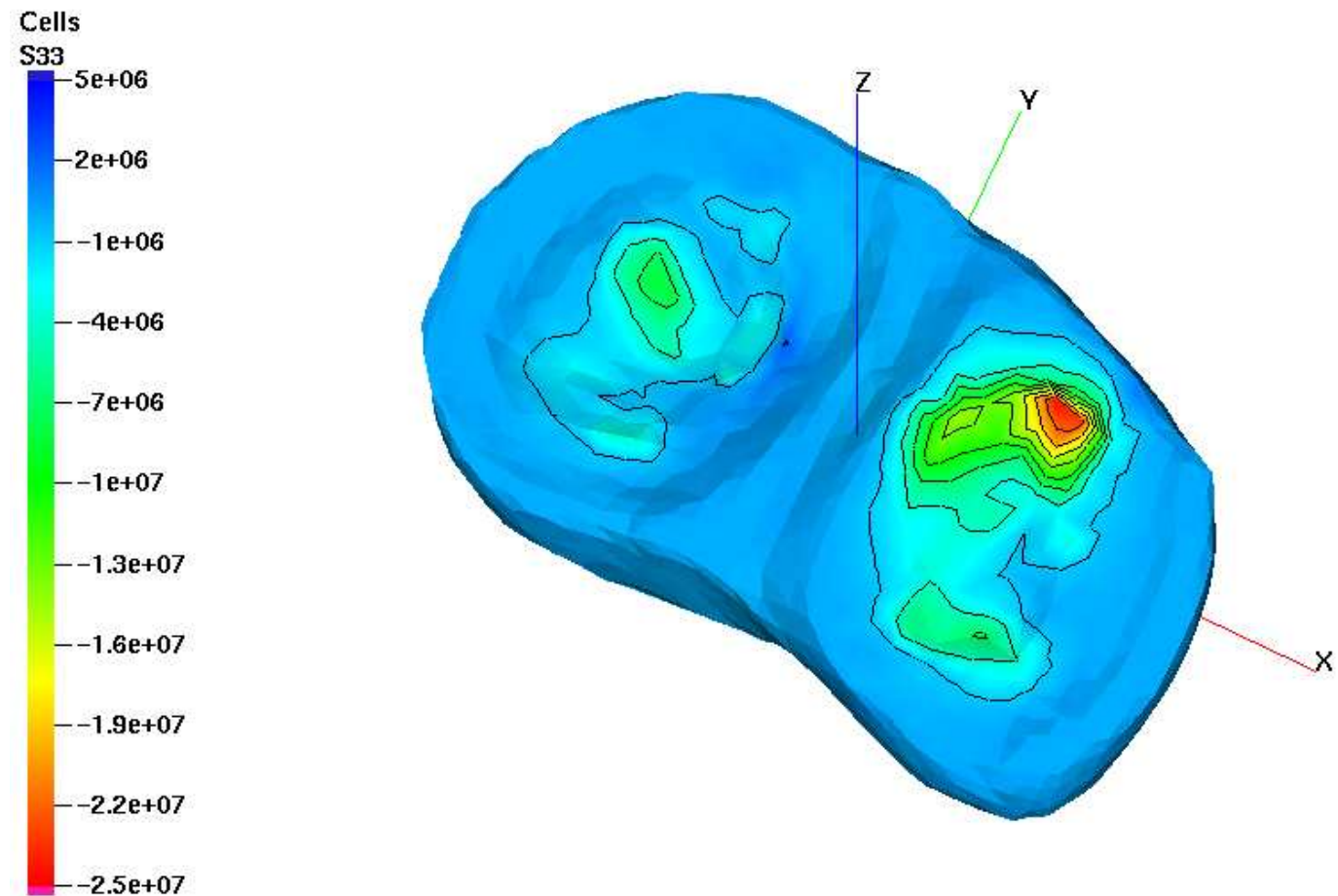
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



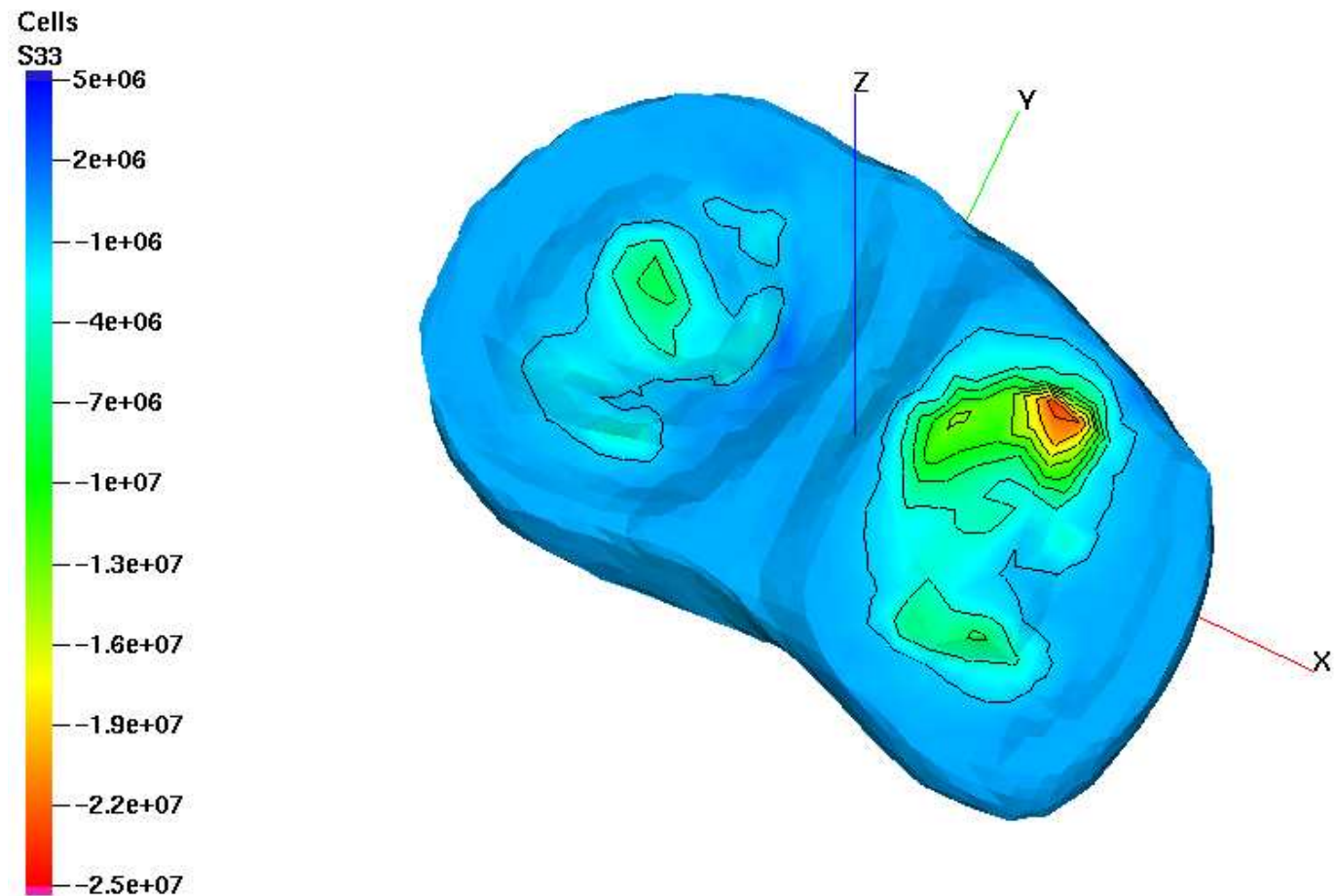
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



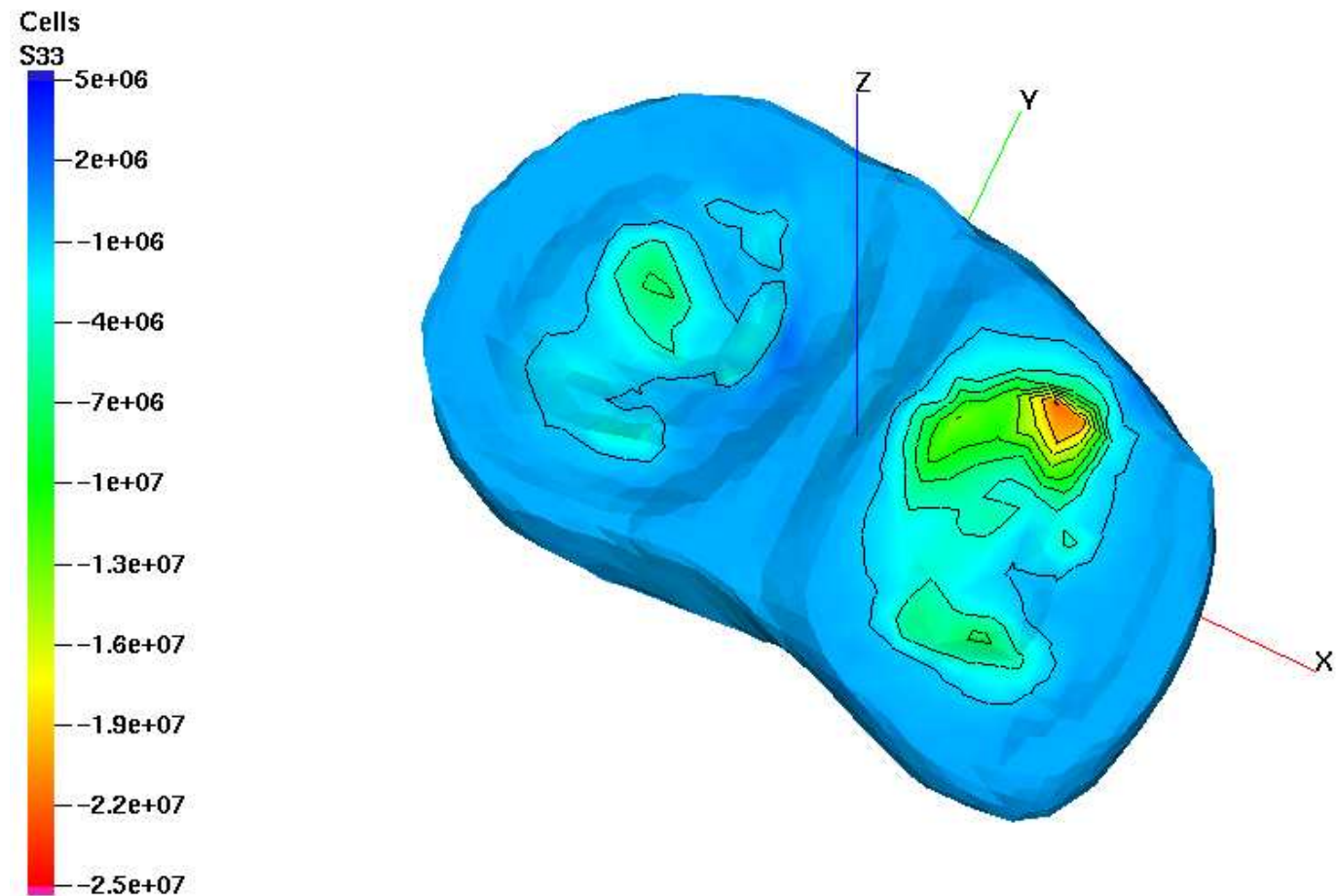
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



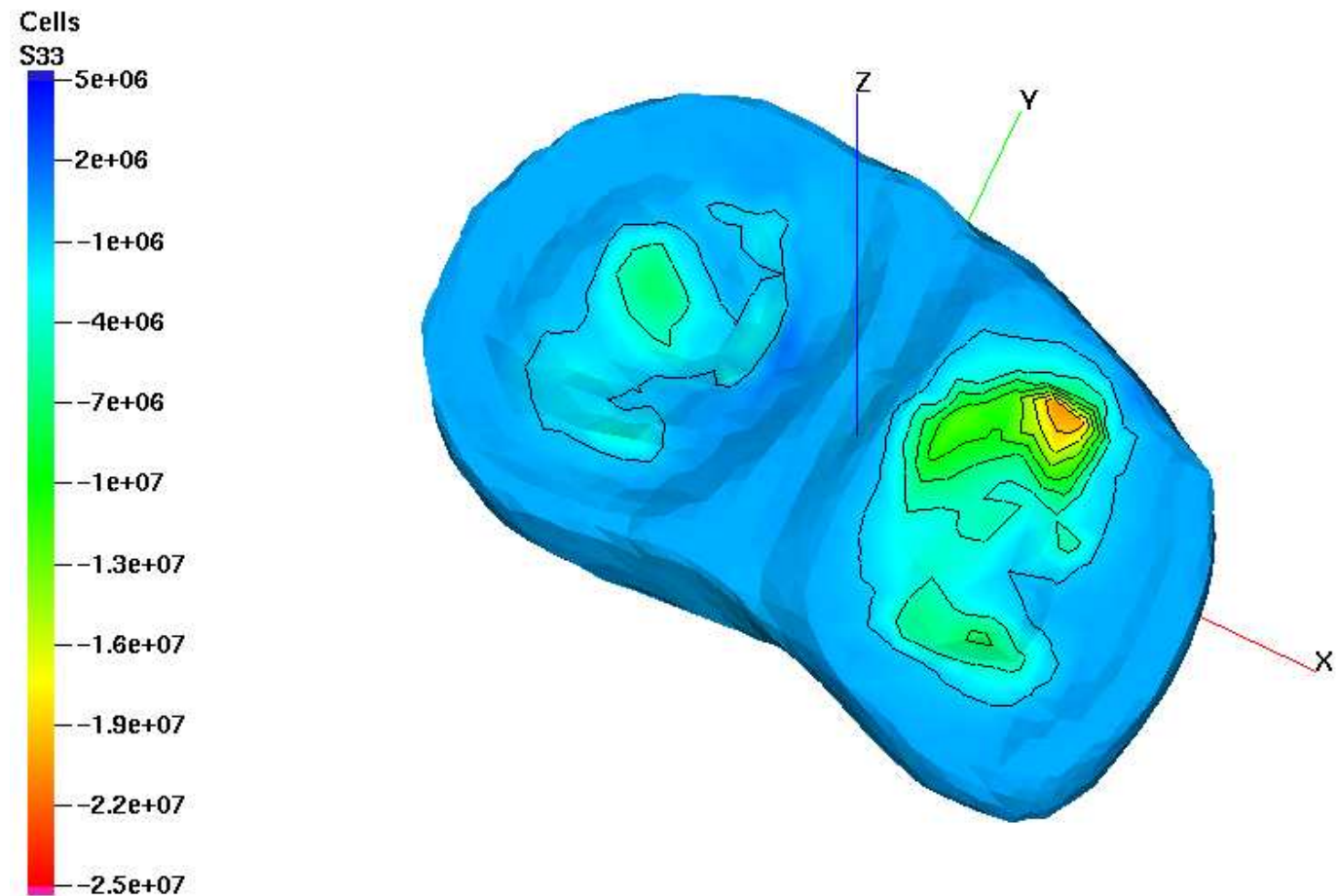
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



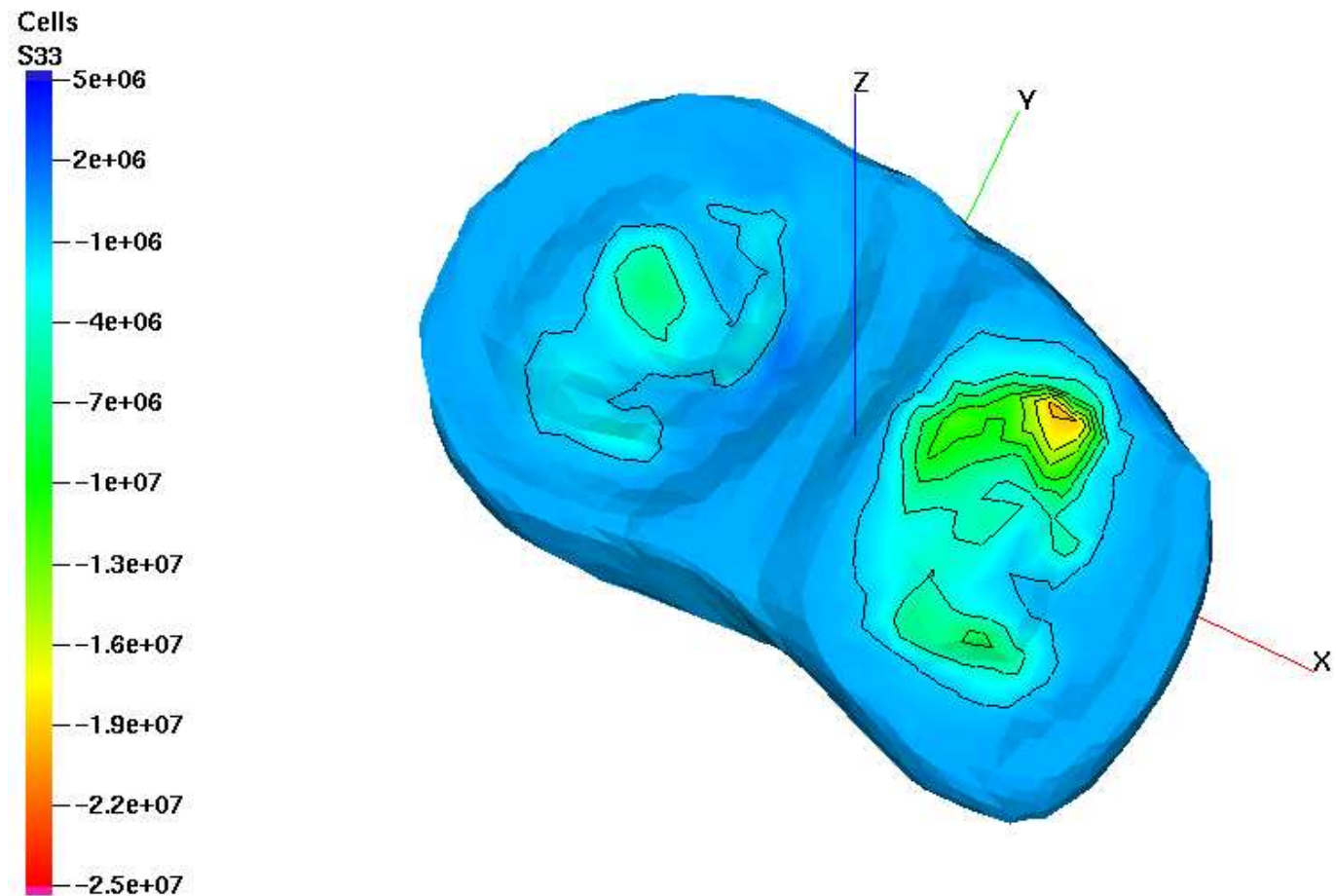
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



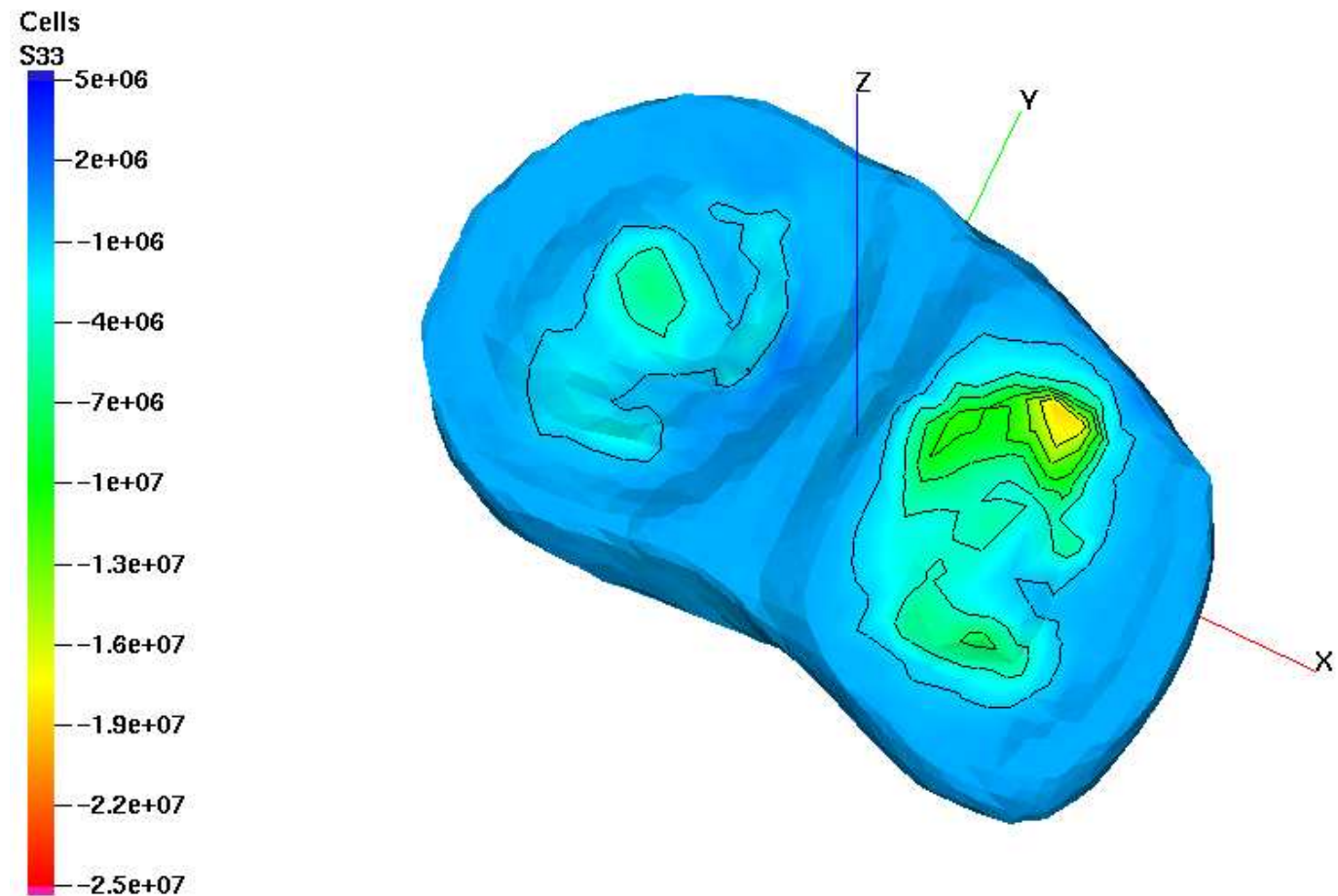
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



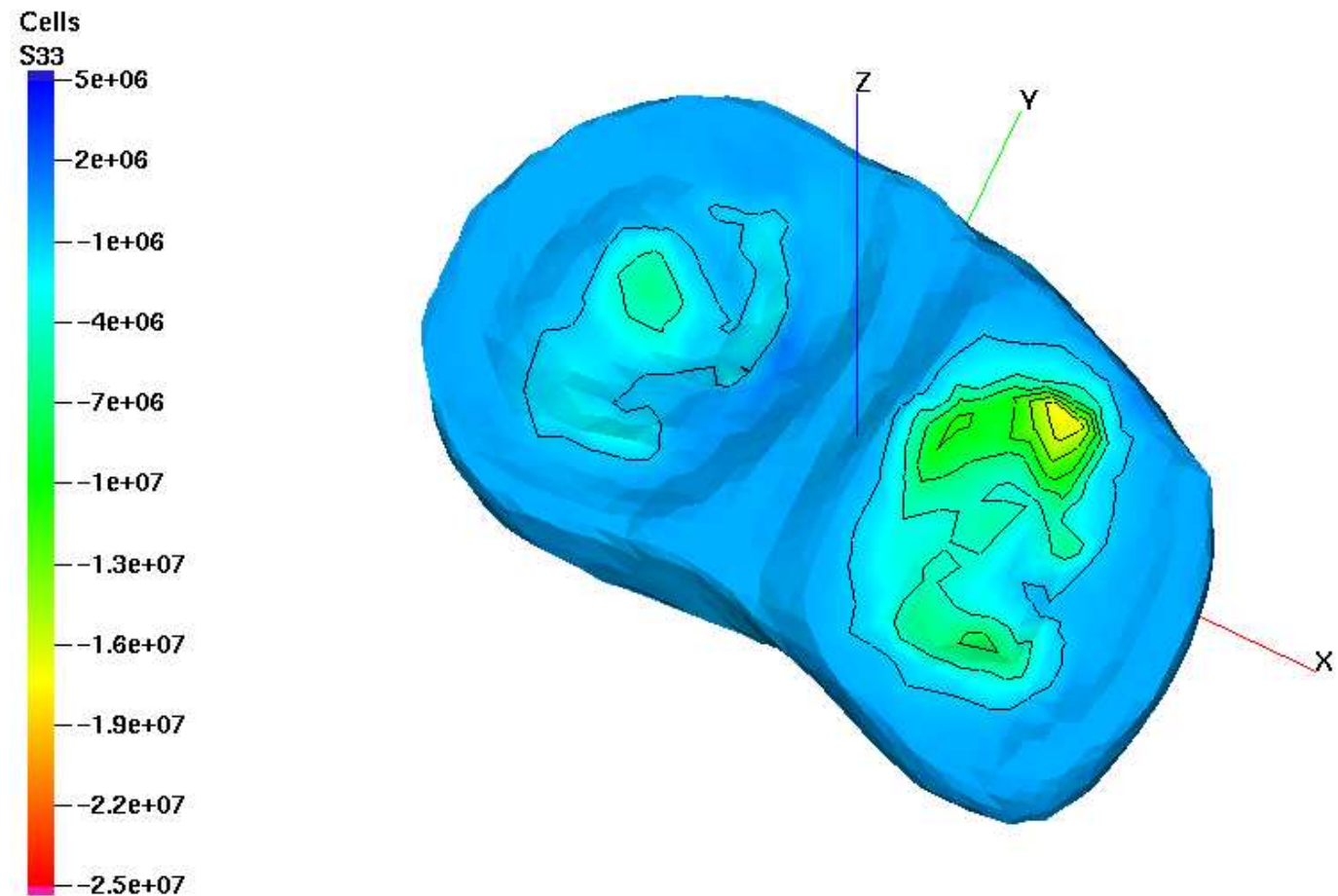
MODEL OF KNEE JOINT

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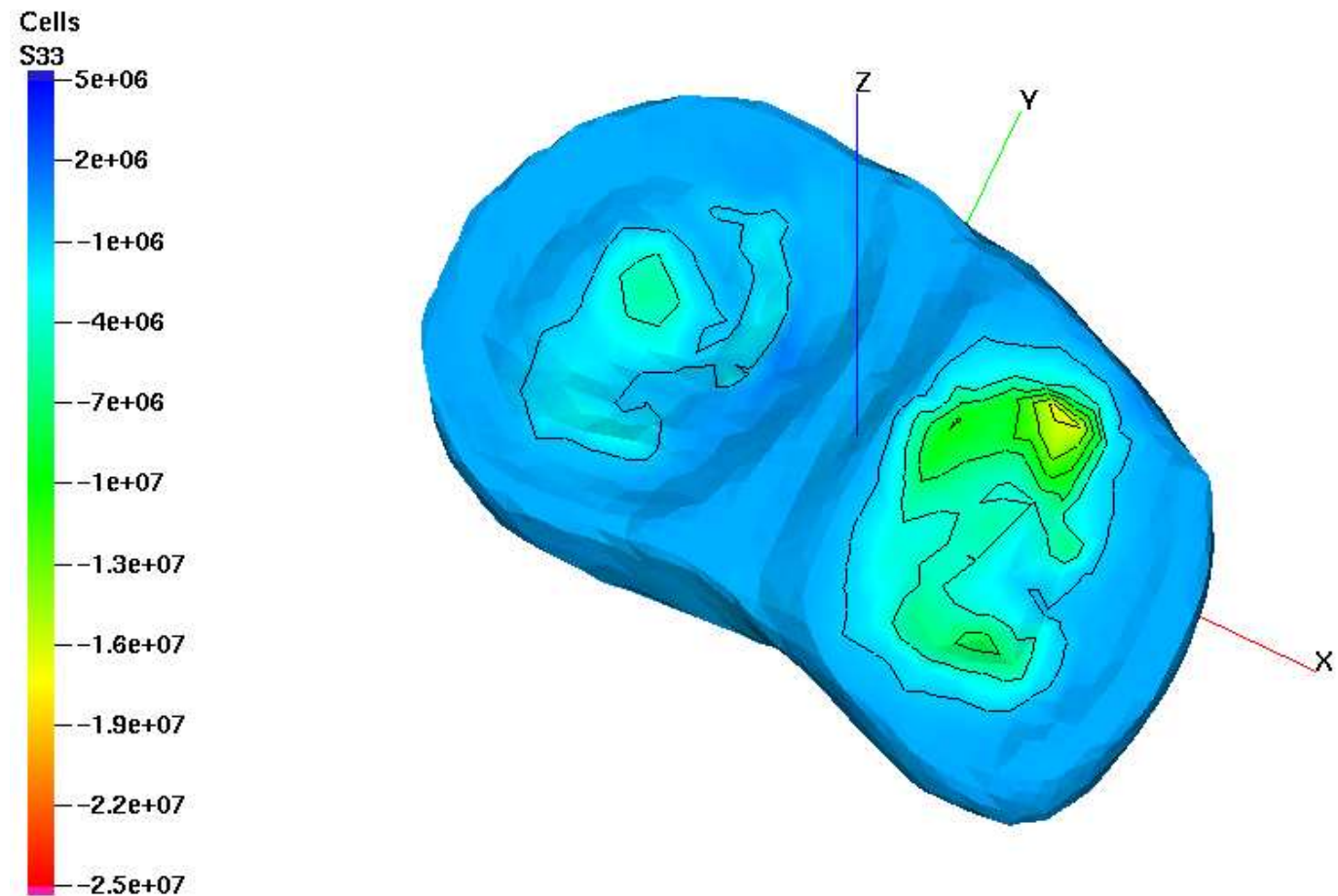
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



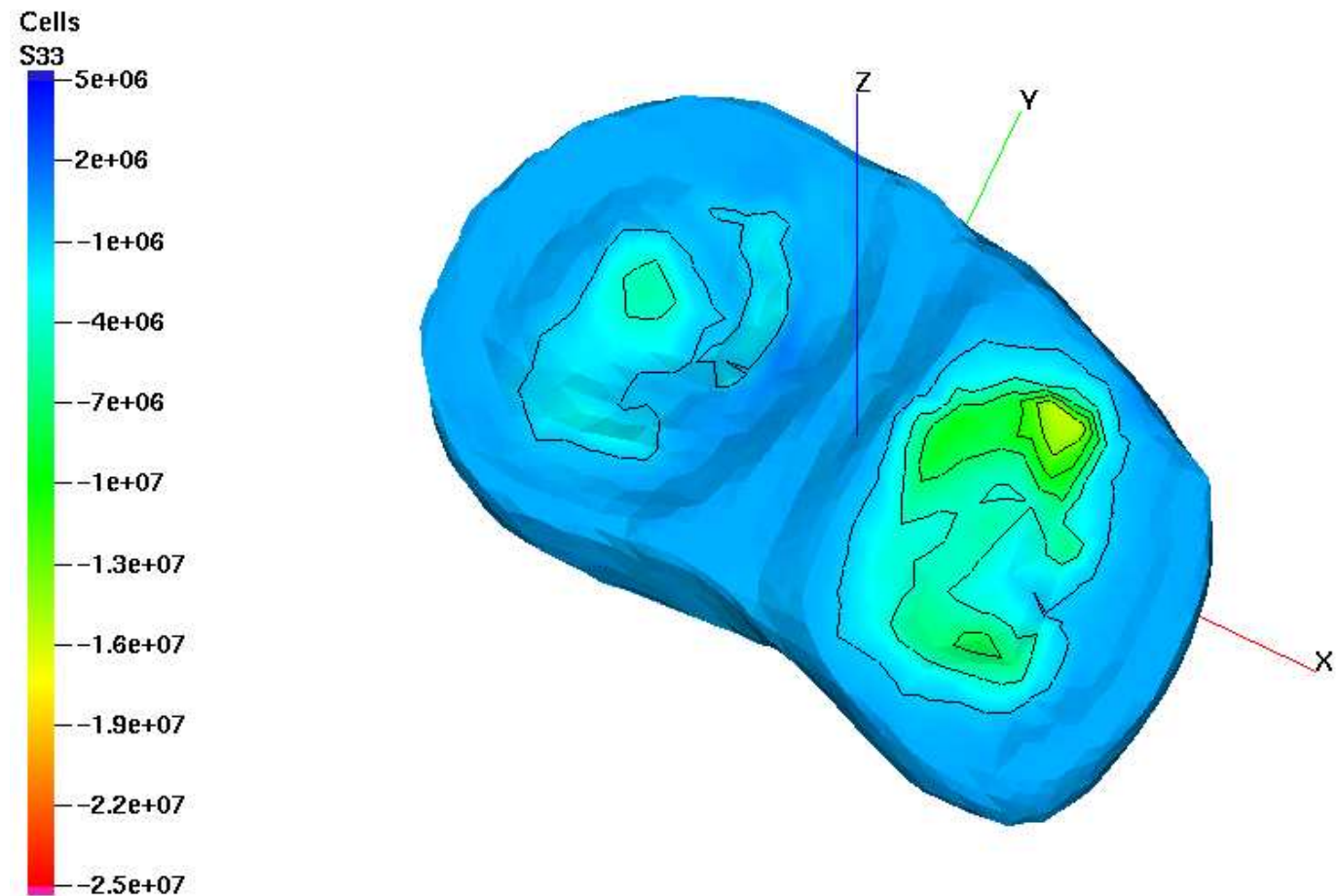
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



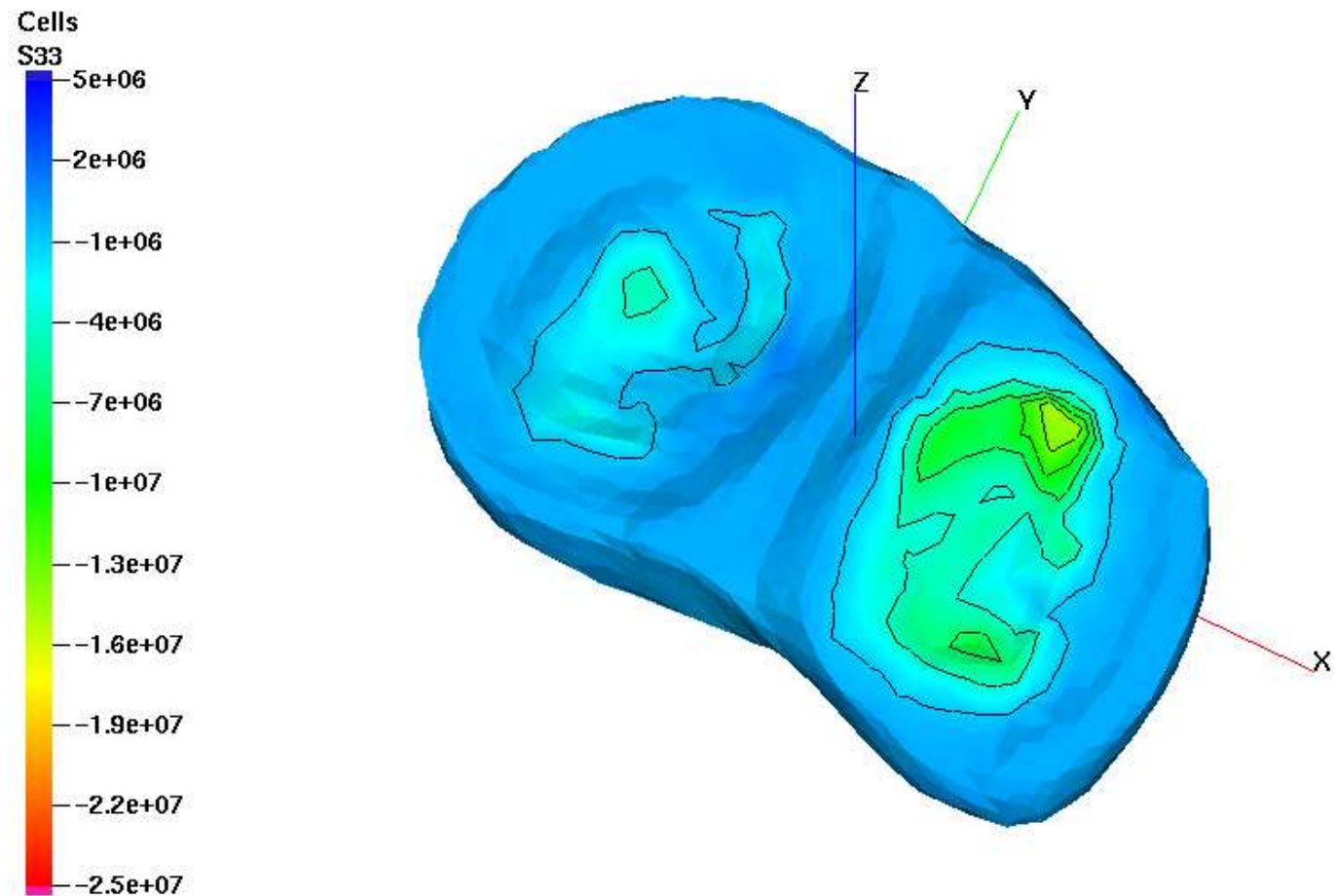
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



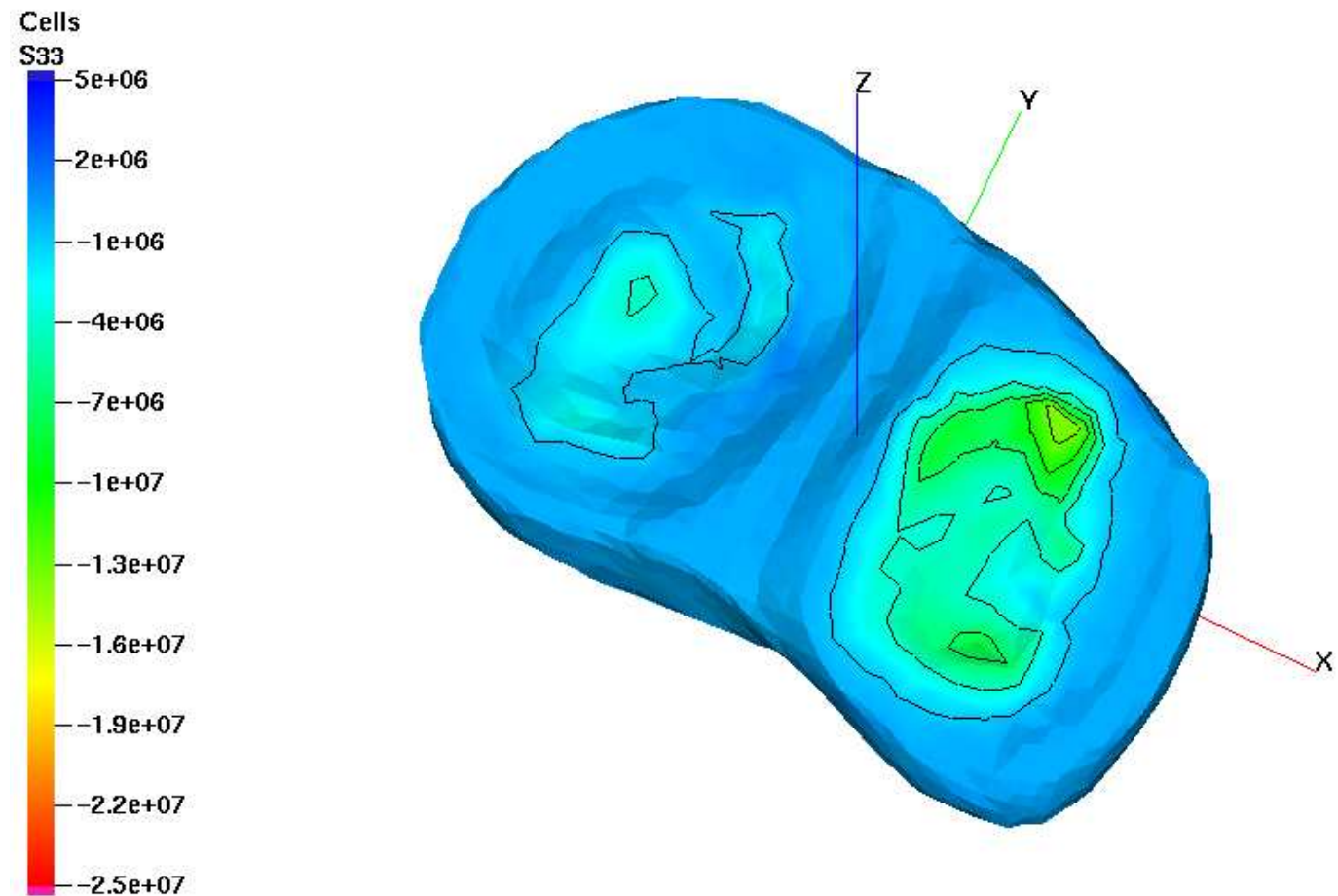
MODEL OF KNEE JOINT

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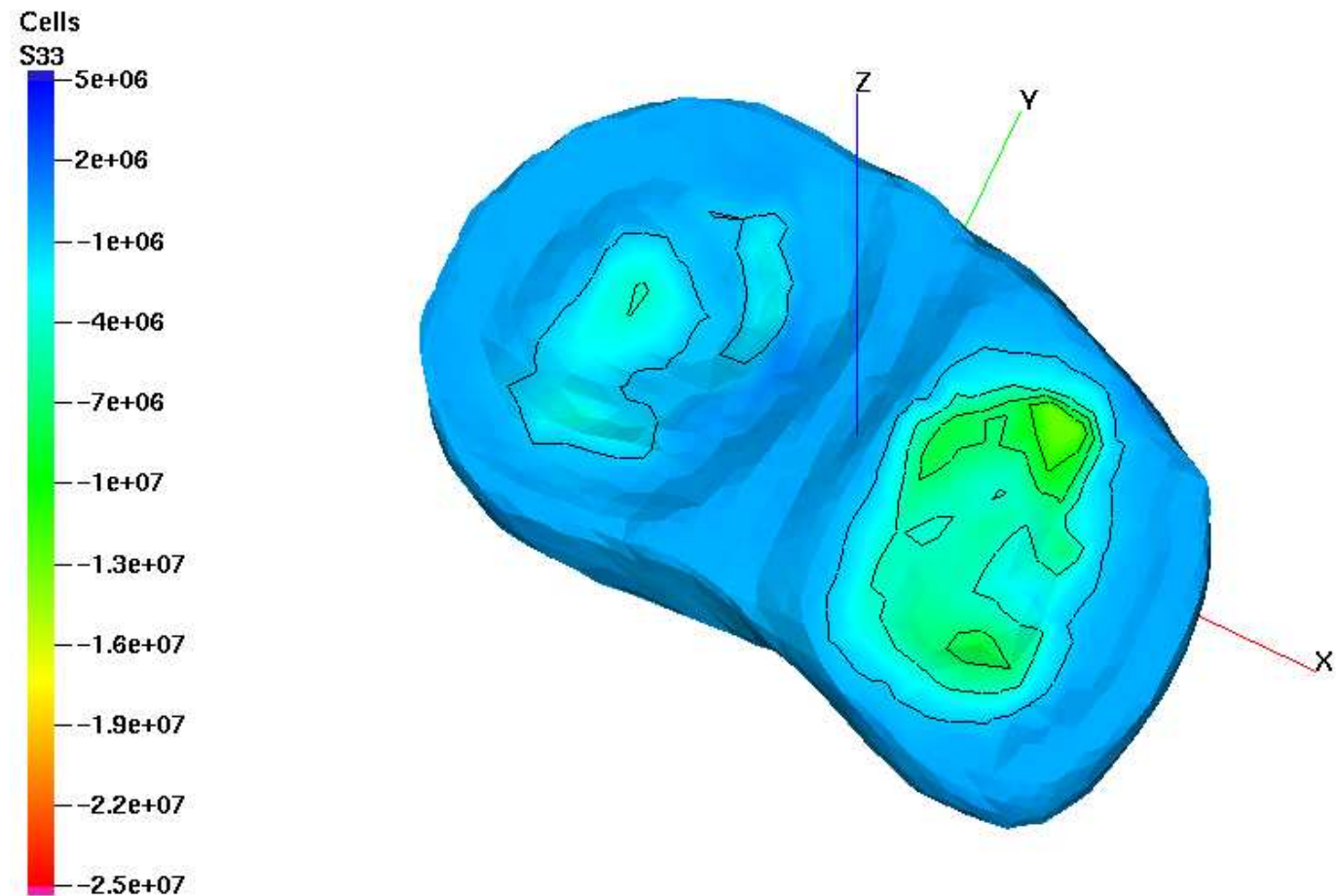
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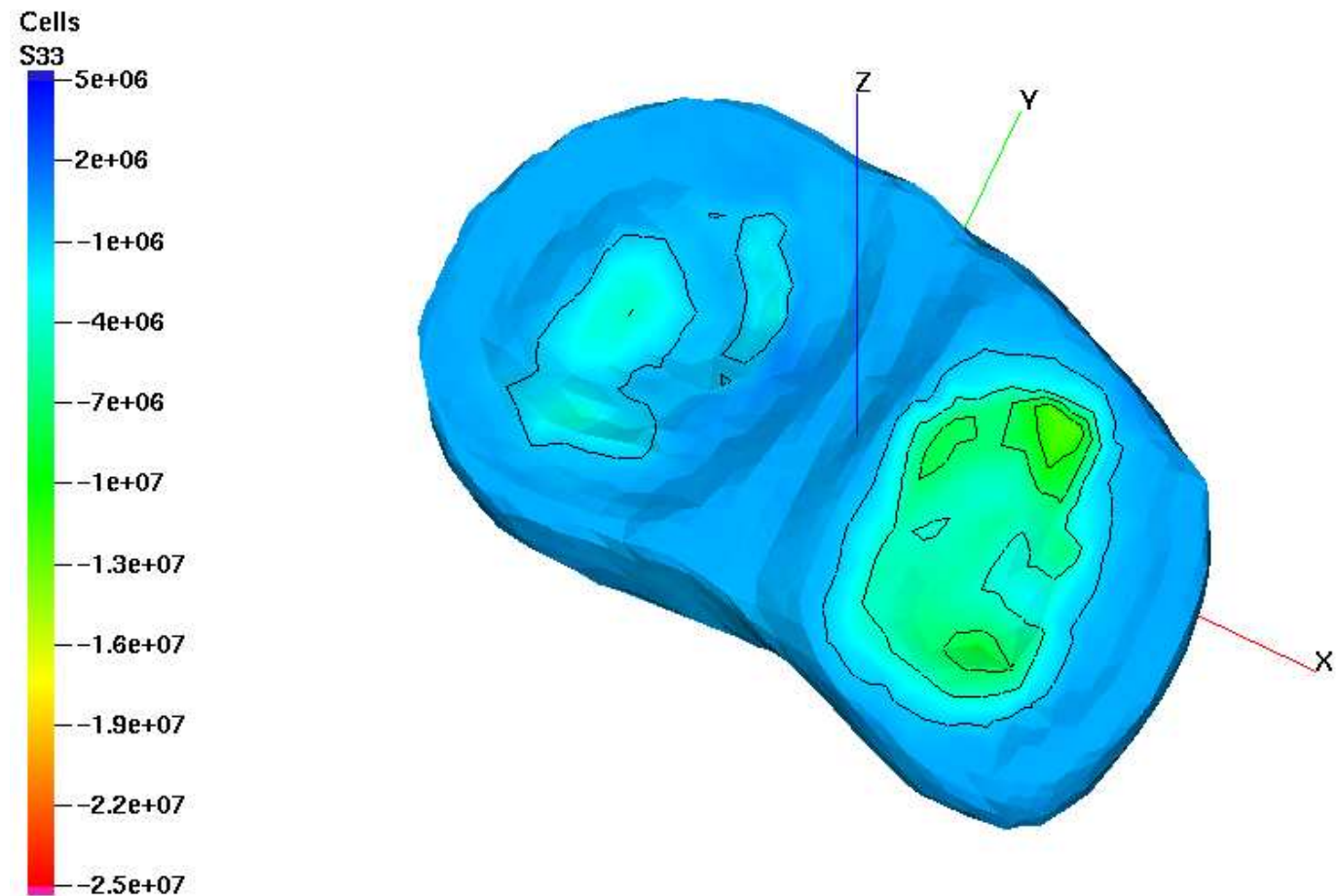
MODEL OF KNEE JOINT

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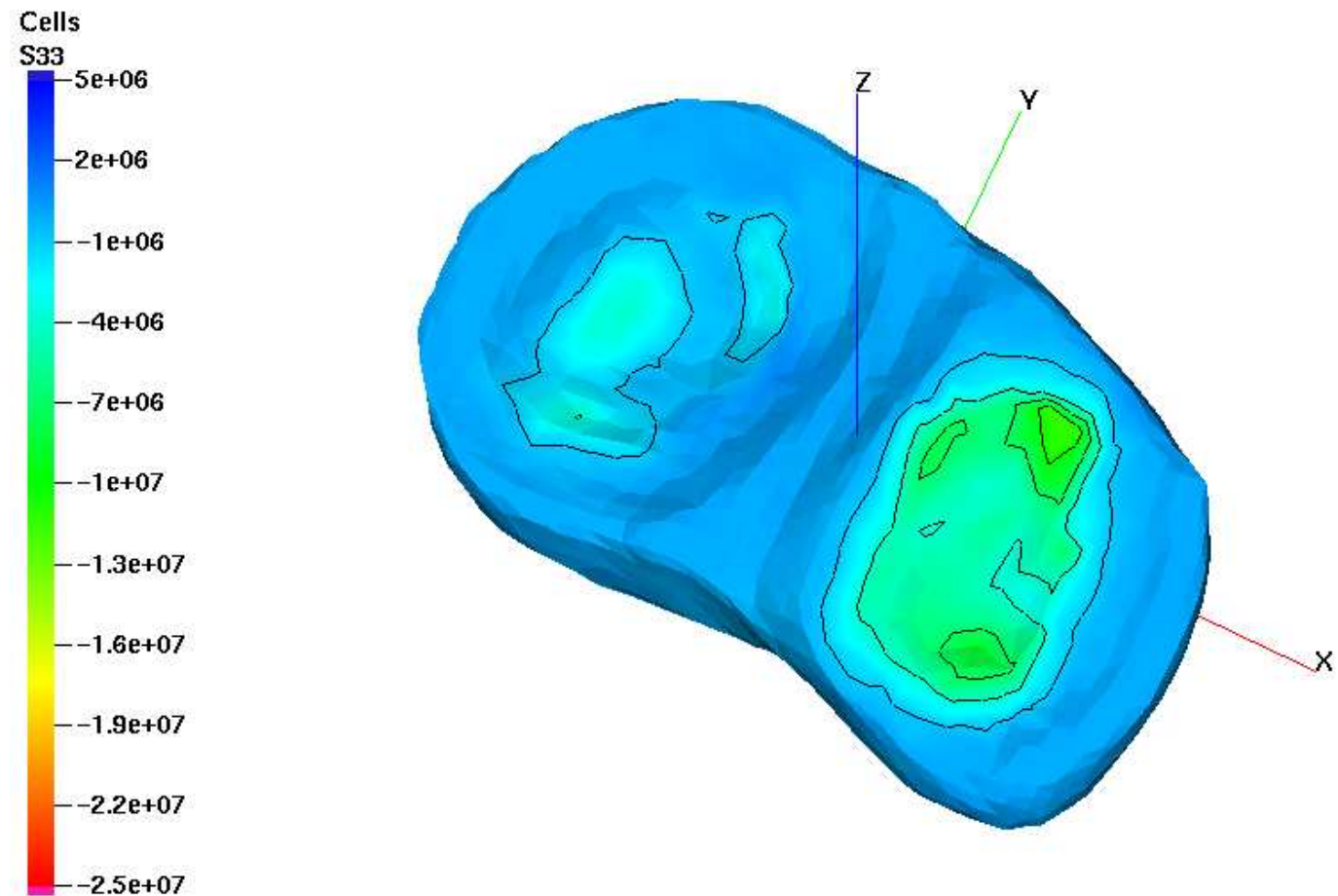
MODEL OF KNEE JOINT

component τ_{zz} of the stress tensor on meniscus



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