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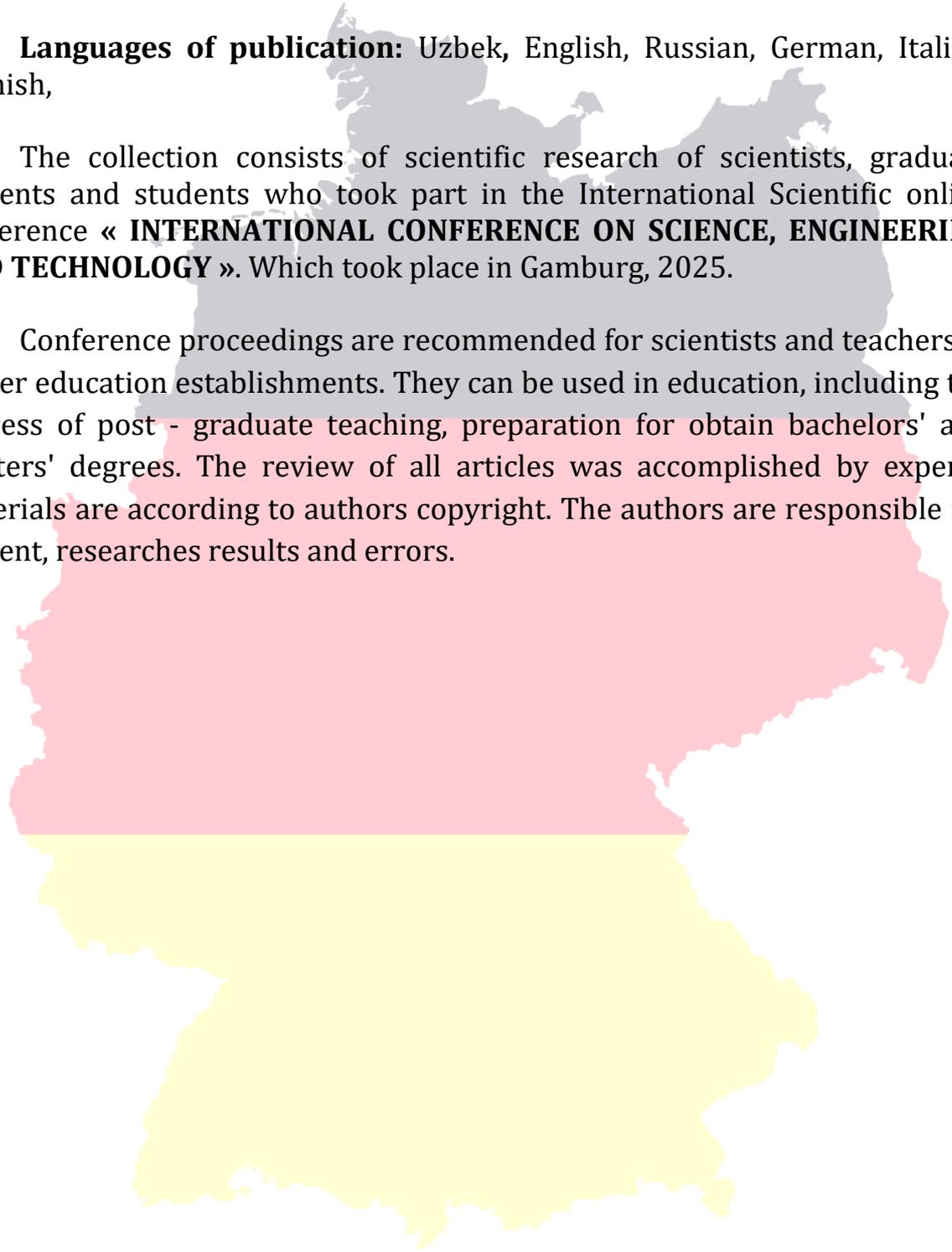


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COMSOL Multiphysics 6.2 dasturining afzalliklari.

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Annotatsiya. COMSOL Multiphysics 6.2 dasturini bir qancha afzalliklari bor. Birinchidan bir vaqtning o'zida issiqlik, oqim, mexanika, elektromagnit va kimyo jarayonlarini modellashtirish mumkin. Masalan: avtomobil divigateli (issiqlik+oqim+mexamik stress+akustika birlashib bitta model hisoblanadi. Ikkinchidan ichki 3D model chizish imkoniyati mavjud (block,Cylinder,Polygon va hk) mumkin.Uchinchidan material kutubxonasi mavjud. Ichida 4000+ tayyor material: po'lat ayuminiy, shisha, pomirerlar va hk. Materialning issiqlik,mexanik va elektr xossalari avtomatik qo'llaniladi.To'rtinchidan issiqlik +strukturaviy stress qizigan detal kengayish hisoblanadi.

Kalit so'zlar: COMSOL Multiphysics6.2 temperature, isiqlik, vaqt, zichlik, model, alyuminiy, elekromagnit, oqim, po'lat, shisha, dasturlash, divigatel.

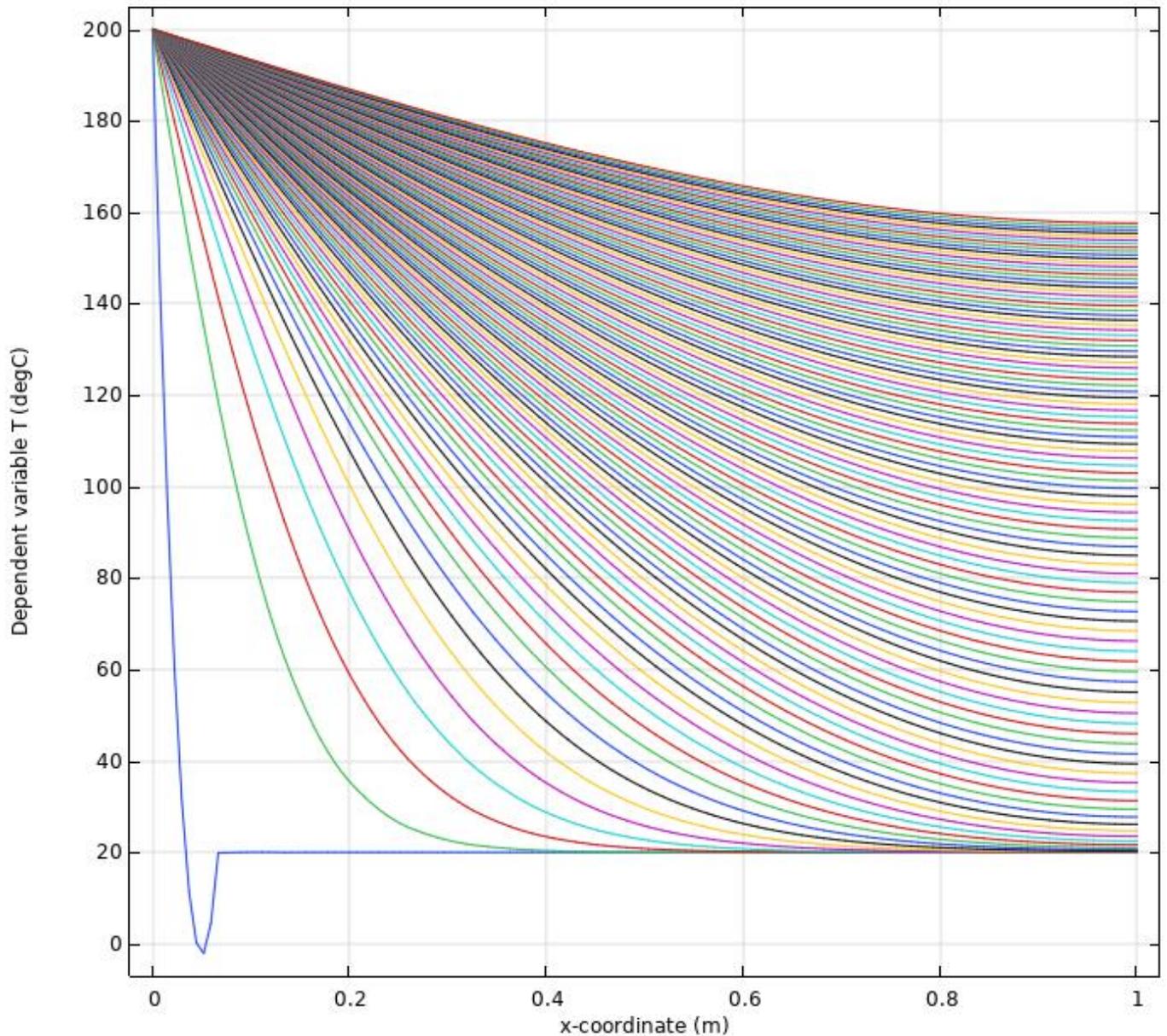
Kirish. COMSOL Multiohsics6.2 dasturi bir qancha jarayonlarni amalga oshiradi.

- 1) Ko'p fizikali muhitni modellashtirish.
- 2) 3D geometriya va CAD integratsiya .
- 3) Material kutubxonasi.
- 4) Bo'limlararo bog'lanish (Multiphysics coupling).
- 5) Meshlash(to'rga ajratish) imkoniyati.
- 6) Natijalarni vizualatsiya qiliish.
- 7) Soddalik va avtomatlashtirish.
- 8) Sanoat va ilmiy qo'llanishi.

COMSOL Multihysics 6.2 da yuza bo'ylab issiqlik tarqalishini qancha vaqtda amalga oshishini ko'rib chiqadigon bo'lsek bizga Mac Carmack usulidan foydalanishimiz mumkin. Buning uchun bizga COMSOL dasturida 2D element qatoriga o'tib olamiz. Matlab ga kiramiz.COMSOL LiveLink yordamida (MATlab ichida) xar bir vaqt bosqichida COMSOLDan sirt bo'yicha T noldan qiymatlarini beramiz COMSOLda bu funkisiyalar ishlatamiz. Matlab ichida Mac Cormack algoritimini yozamiz-predictor va corrector:

Bizga berilgan: mis(CU), issiqlik sig'imi $C_p = 385\text{j/kg} \cdot \text{k}$, zichligi $p = 8930\text{kg/m}^3$

Line Graph: Dependent variable T (degC)



$\lambda = 390 \frac{W}{m} * K$. Ichki issiqlik manbalari mavjud bo'lgan issiqlik o'tkuzuvchanlik masalaini Mac Carmack usulida ishlab chiqamiz COMSOL dasturi orqali.

$$e_a \frac{\partial^2 T}{\partial t^2} + d_a \frac{\partial T}{\partial t} + \nabla \cdot (-c \nabla T - \alpha T + \gamma) + \beta \cdot \nabla T + a T = f$$

$$\nabla = \frac{\partial}{\partial x}$$

(1) Formulalardan foydalanamiz.

COMSOL Multiphysics 6.2 da qiymatimiz chiqdi 40 min da $x=0.9111$ $y=84,9$ erishdik.



Xulosa. COMSOL Multiphysics 6.2 da issiqlik tarqalishi materialning issiqlik o'tkazuvchanligiga , yuzada tashqi muhit bilan konveksiya koeffitsiyentiga , geometriya va sirt shakliga bog'lik ekan.natijalar COMSOLda visual tarzda ko'rinadi. Sirt bo'yicha temperatura taqsimoti va issiqlik oqimi vector maydonlarini tahlil qilish mumkin. COMSOLni afzaliklari tajriba qilish qiyin bo'lgan sharoitlarni virtual muhitda ko'rib chiqish mumkin . Murakkab geometriyali sirtlarda issiqlik tarqalishini aniq hisoblash imkonini beradi.

Adabiyotlar

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