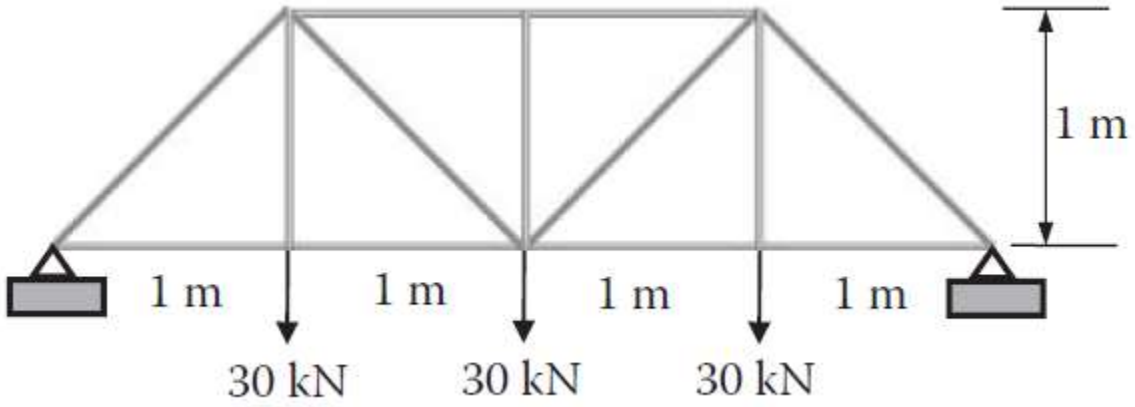
Nedjelja 2
Modeliranje rešetkastih konstrukcija konačnim elementima

Postavka zadatka

Rešetkasta konstrukcija prikazana na slici je izrađena od drvenih greda, kvadratnog poprečnog presjeka WxH=60x60mm. Karakteristike greda od bora: E=13.1 GPa i ν=0.29. Odrediti pomjeranje zglobova konstrukcije.

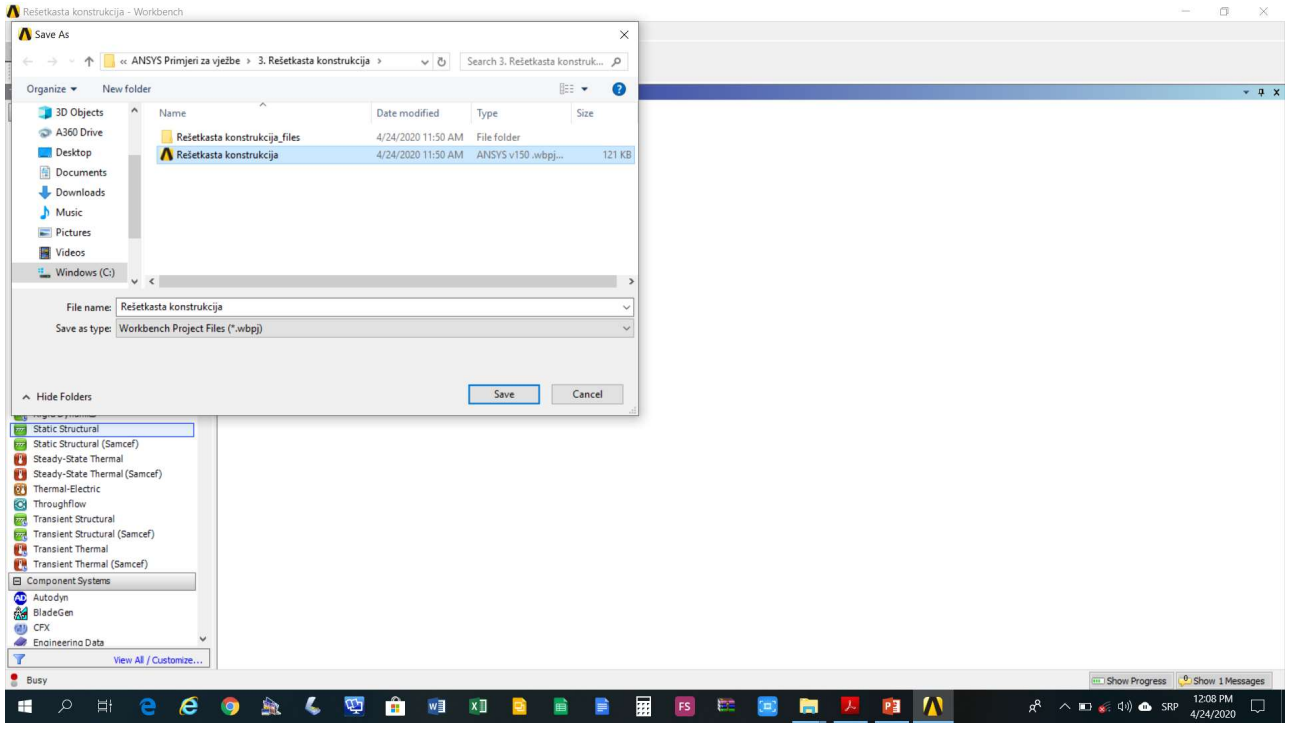


Noseća konstrukcije mosta

Noseća konstrukcija kranske dizalice

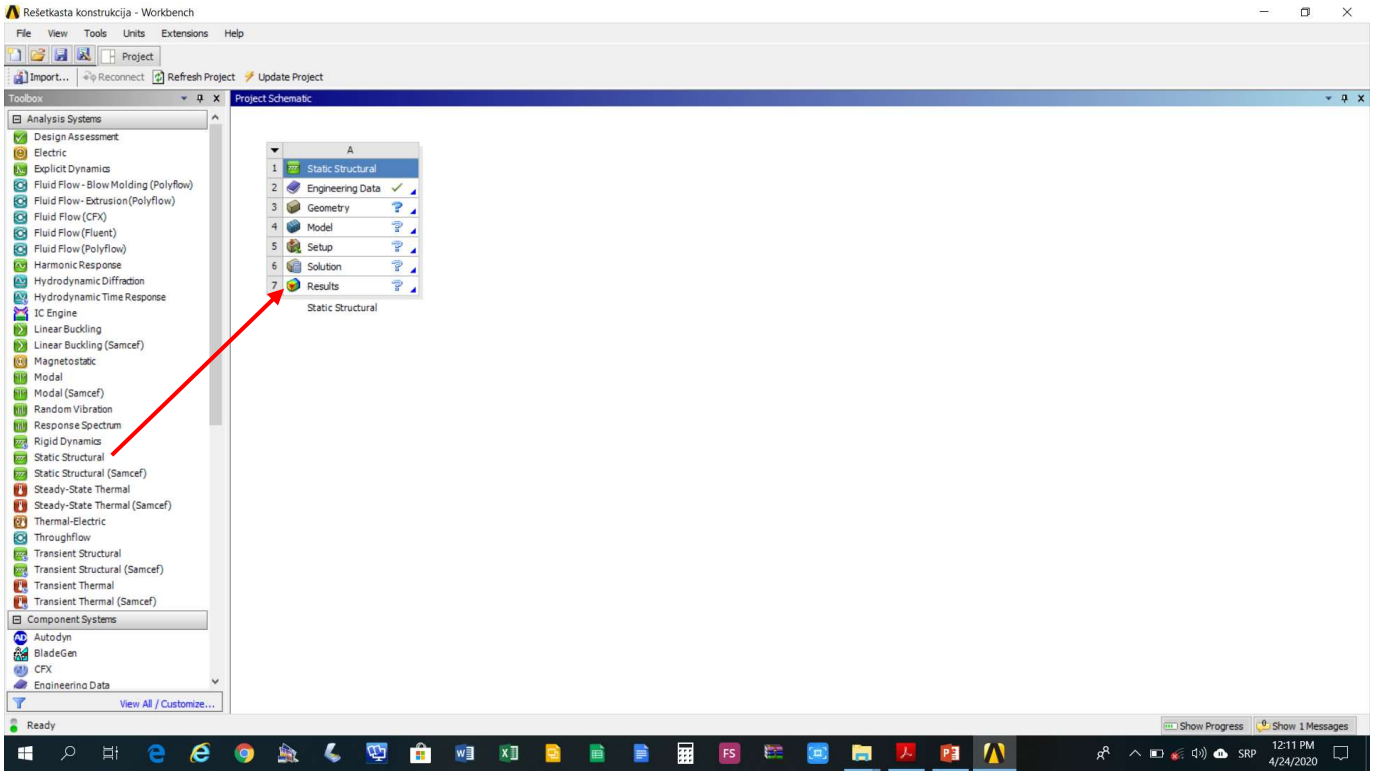
Modeliranje rešetkaste konstrukcije

Aktivirati program ANSYS i sačuvati prazan projekat pod nazivom Rešetkasta konstrukcija



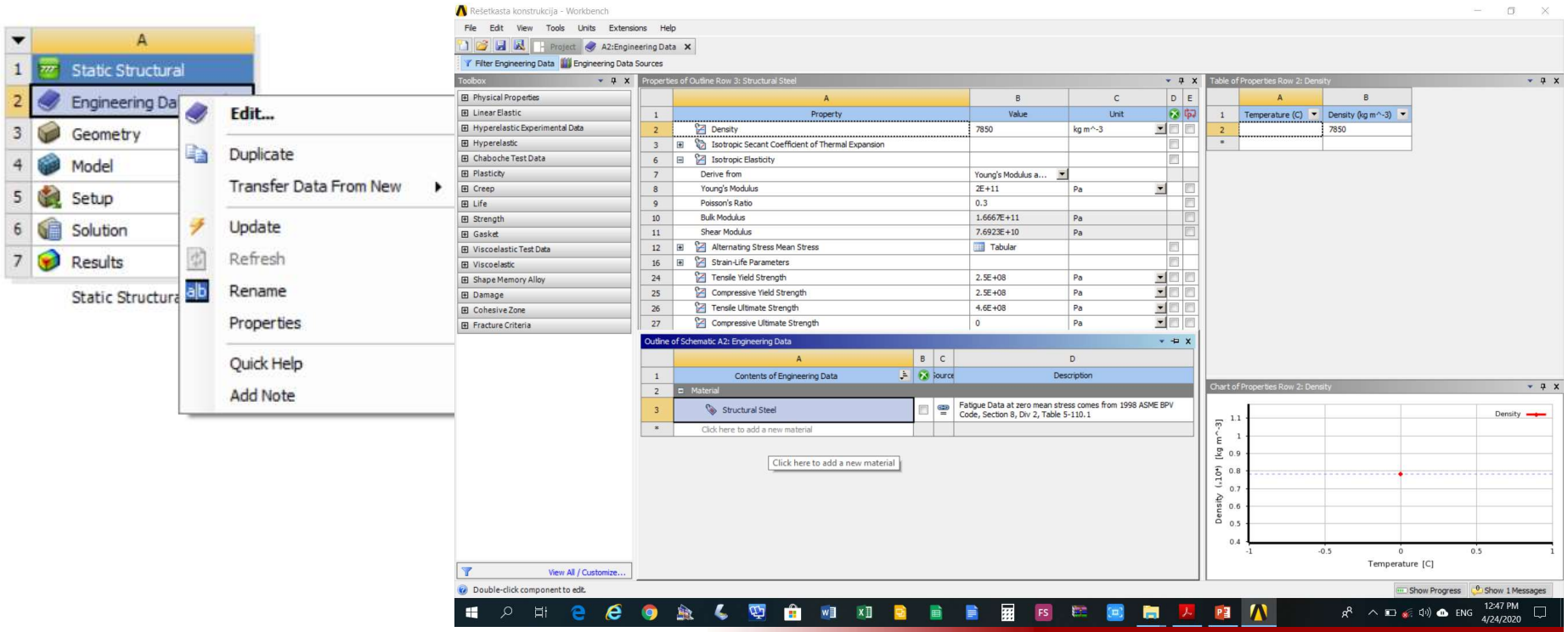
Modeliranje rešetkaste konstrukcije

Kreirati statičku linearnu analizu (*Static Structural*) na shemi projekta (*Project Shematic*)



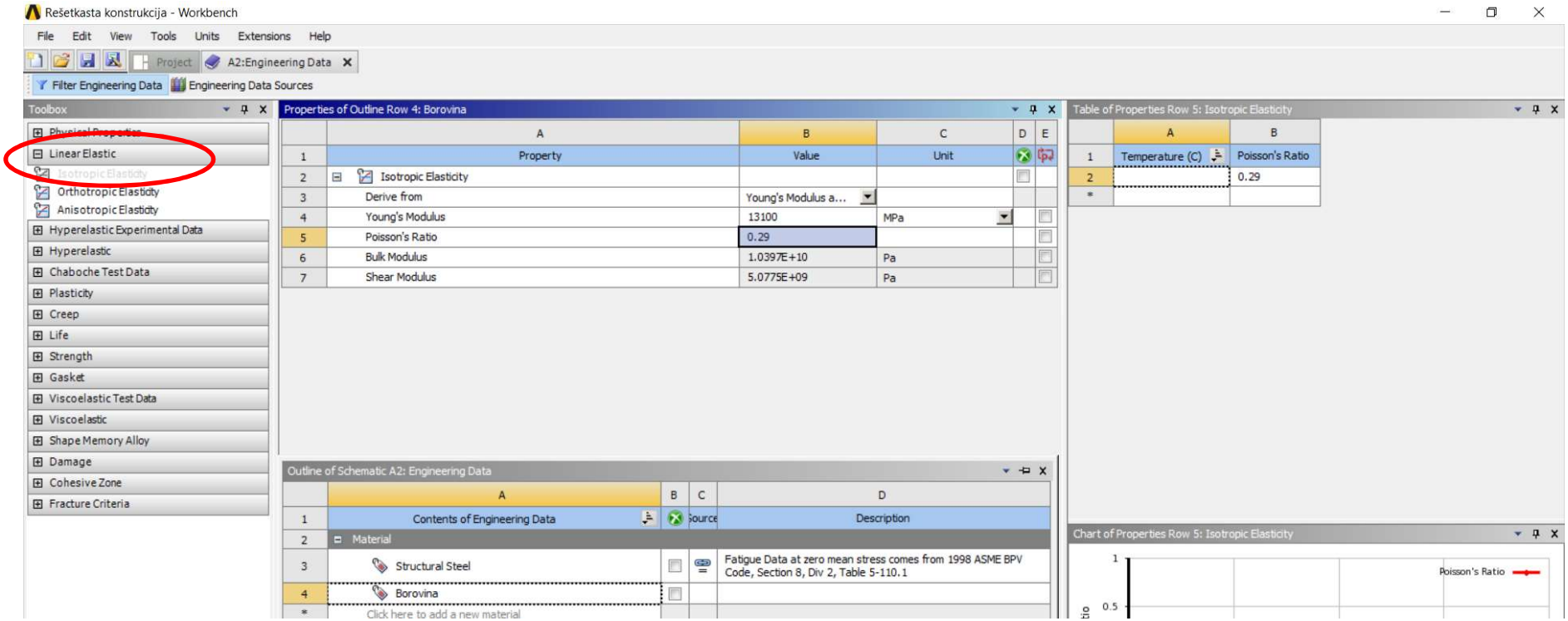
Modeliranje rešetkaste konstrukcije

Aktivirati modul Engineering Data (*Engineering Data->Edit*) i dodati novi materijal *Click here to add new material*



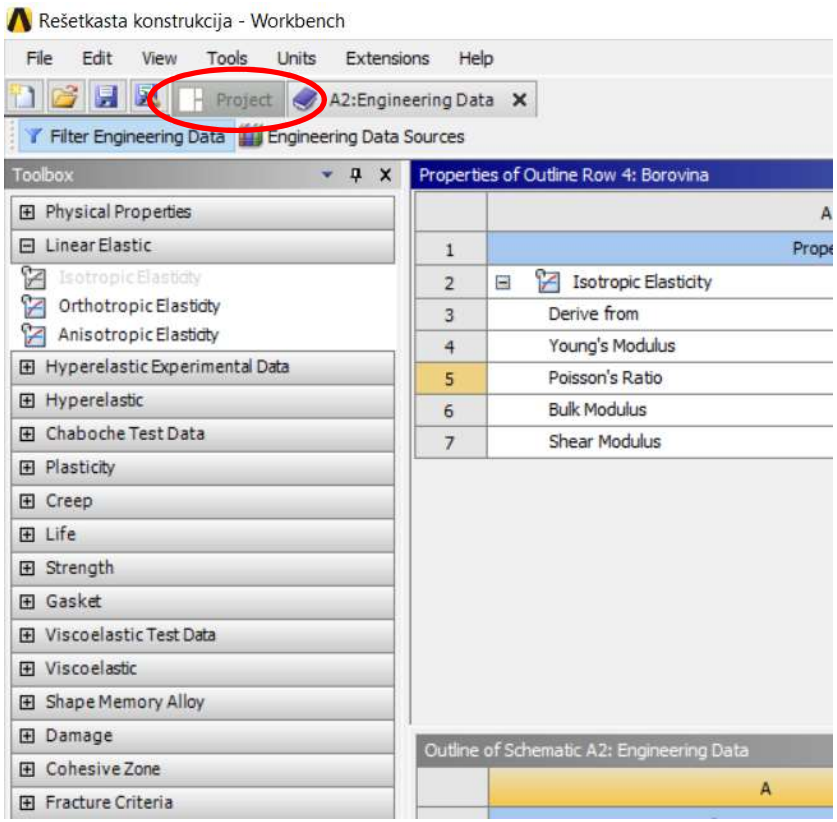
Modeliranje rešetkaste konstrukcije

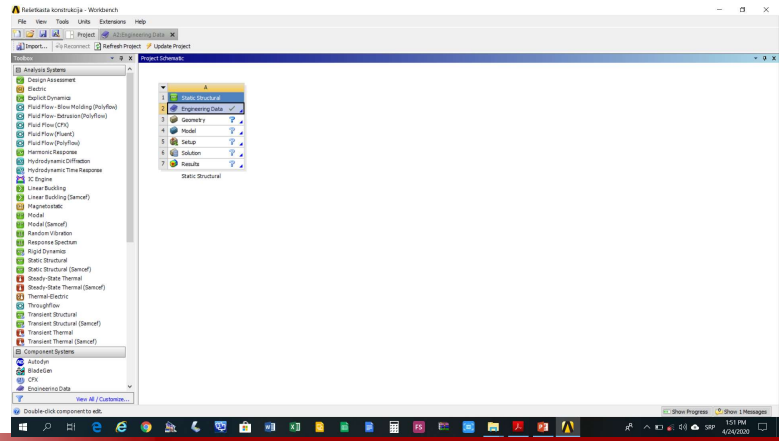
Unijeti karakteristike novog linearno elastičnog i izotropnog materijala (*Isotropic Elasticity*)



Modeliranje rešetkaste konstrukcije

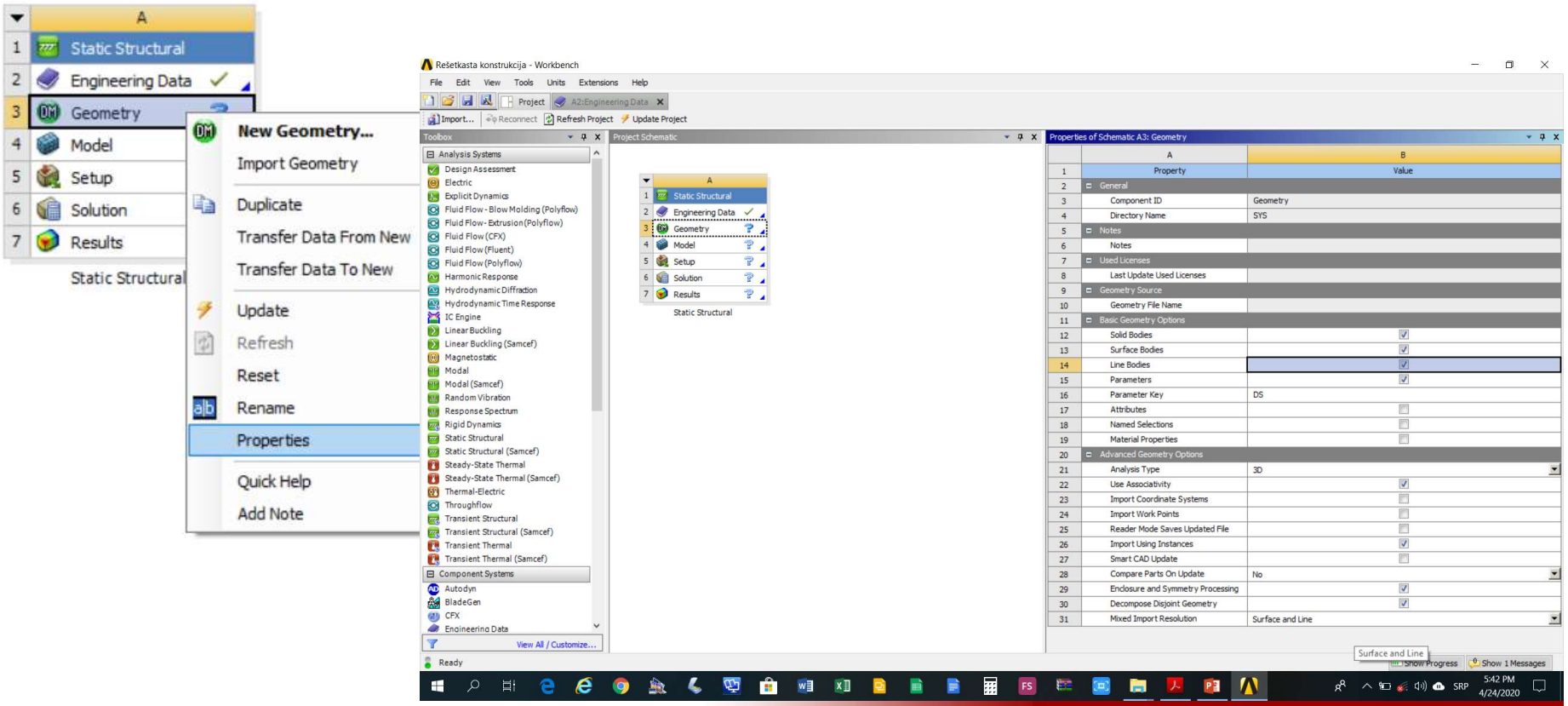
Izabrati opciju *Project* za povratak na shemu projekta





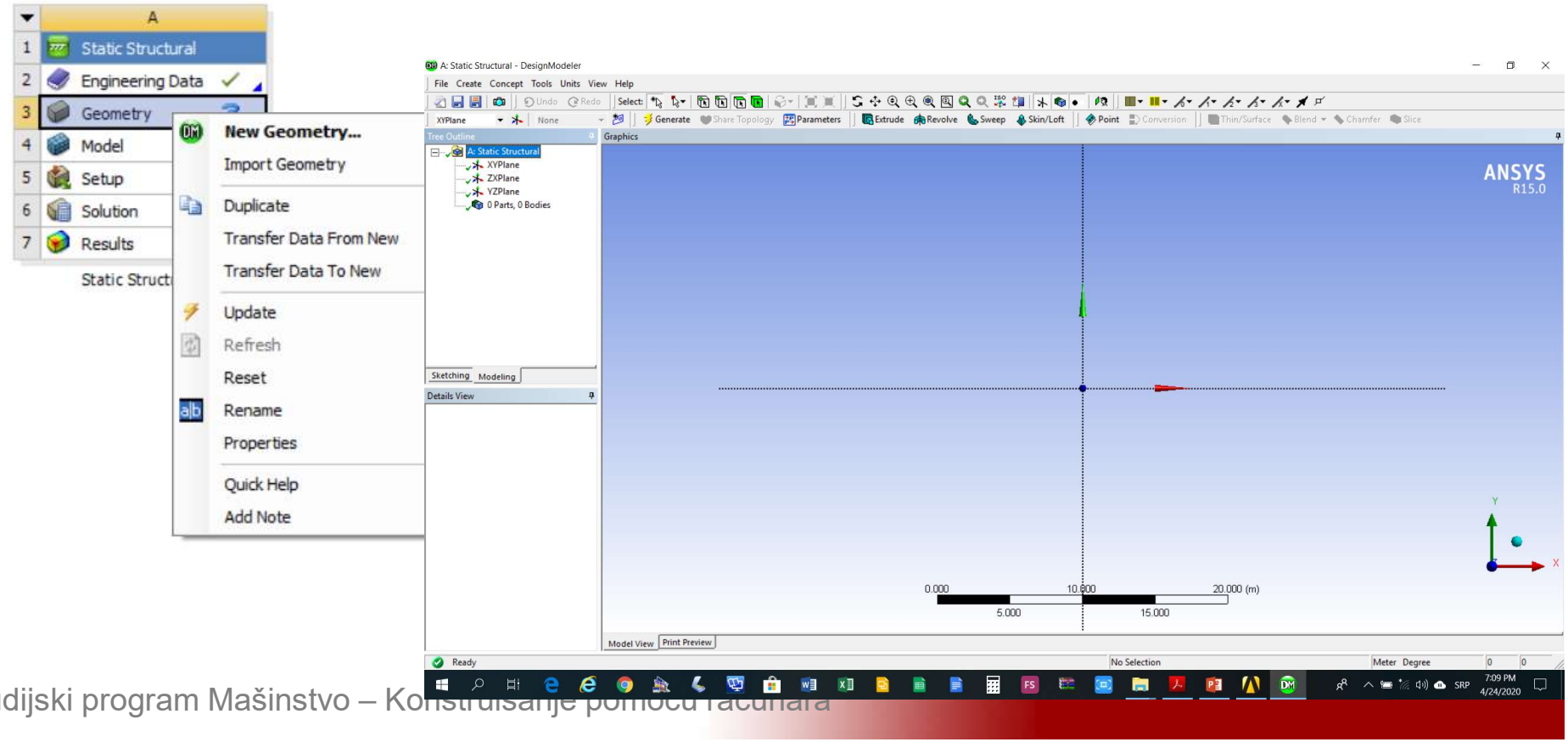
Modeliranje rešetkaste konstrukcije

Izvršiti podešavanja modula Design Modeler (*Geometry->Properties->Line Bodies = On*)



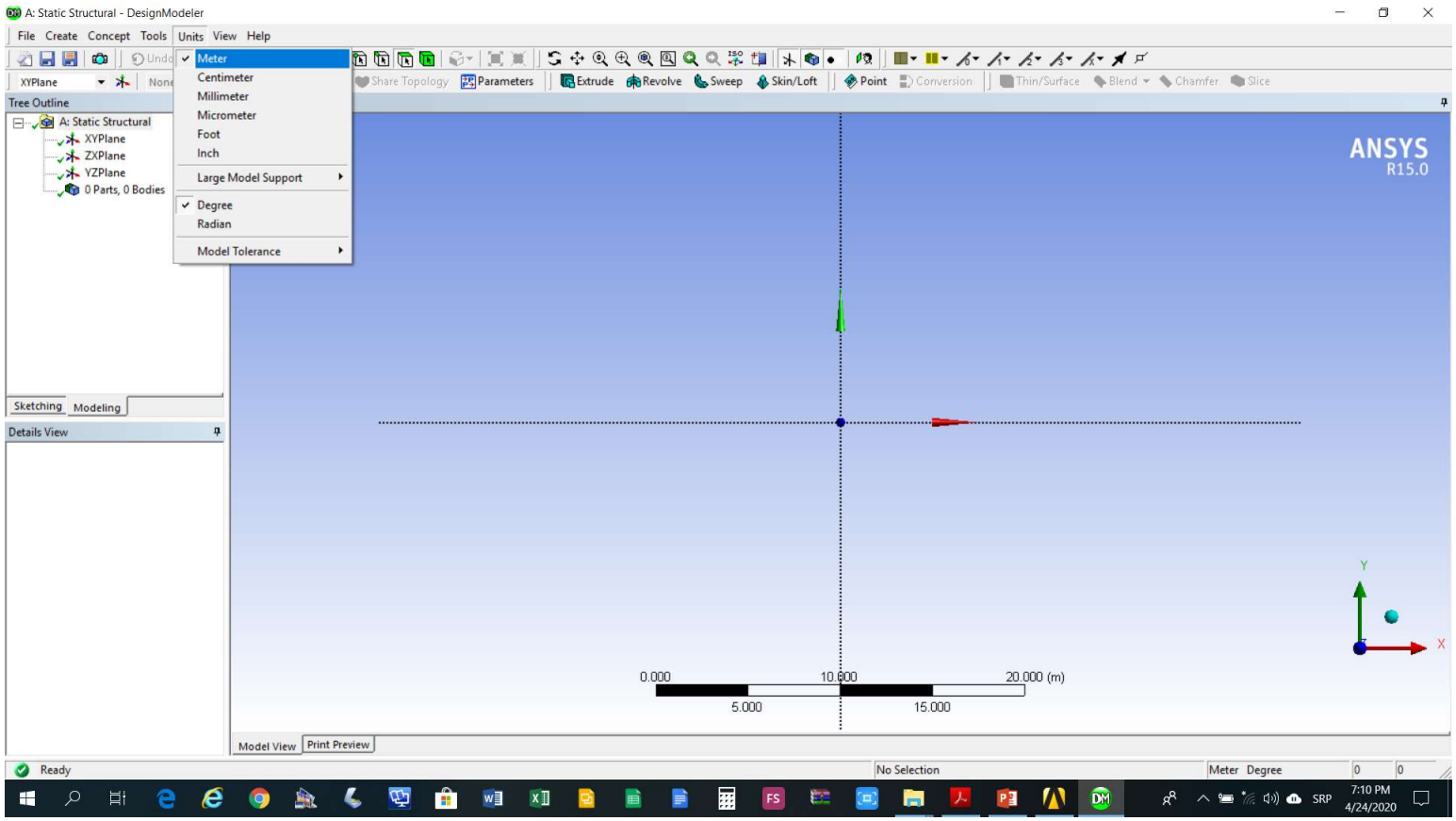
Modeliranje rešetkaste konstrukcije

Aktivirati modul Design Modeler (*Geometry->New Geometry*)



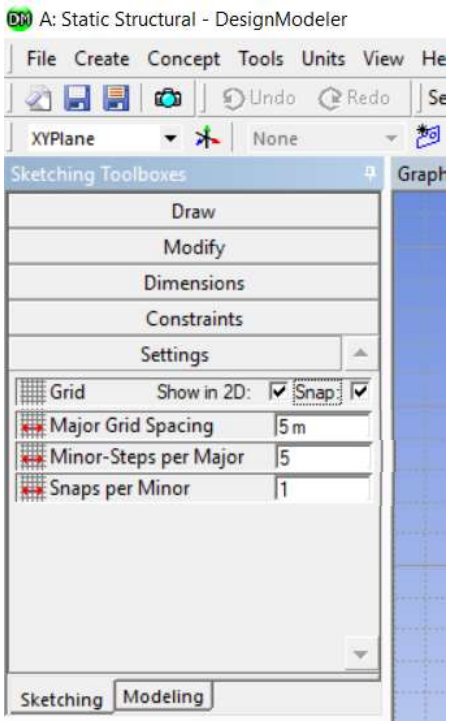
Modeliranje rešetkaste konstrukcije

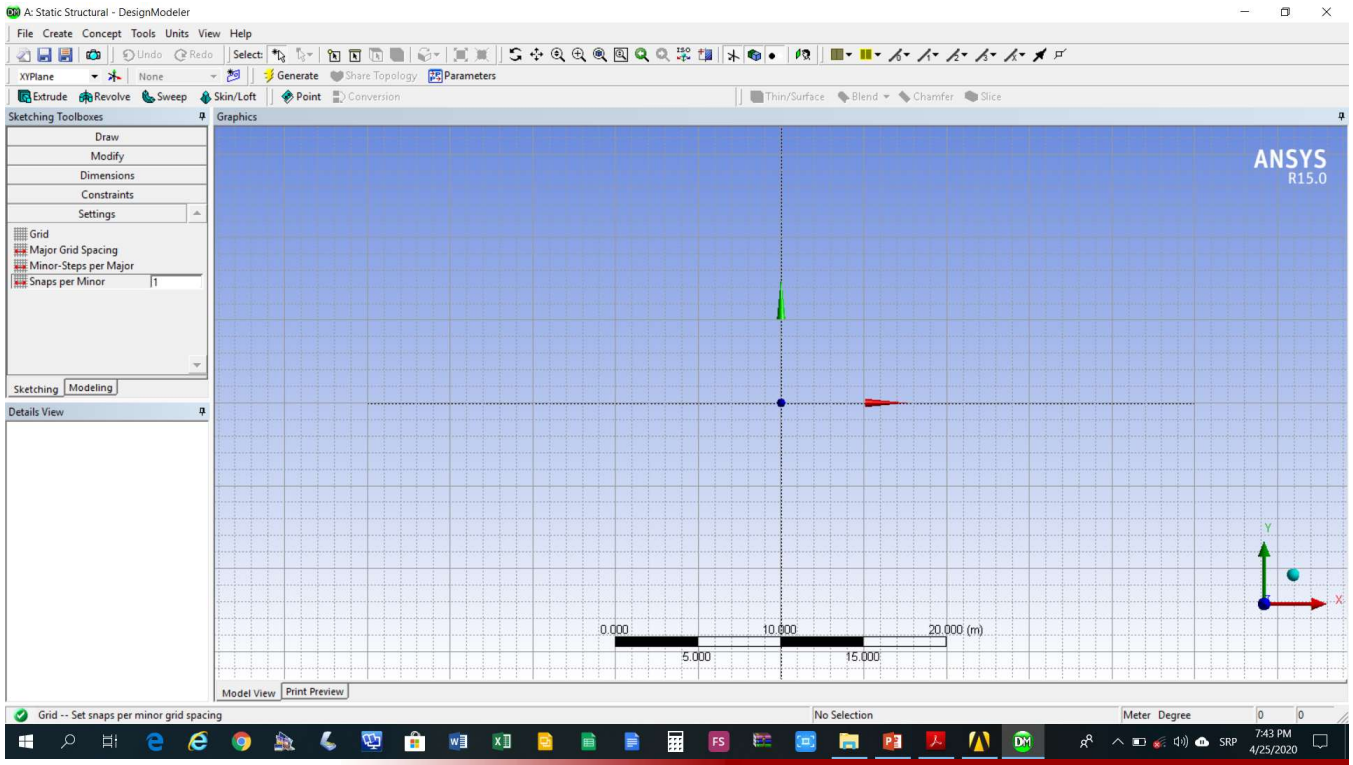
Podesiti dužinske jedinice (Units->*Meter*)



Modeliranje rešetkaste konstrukcije

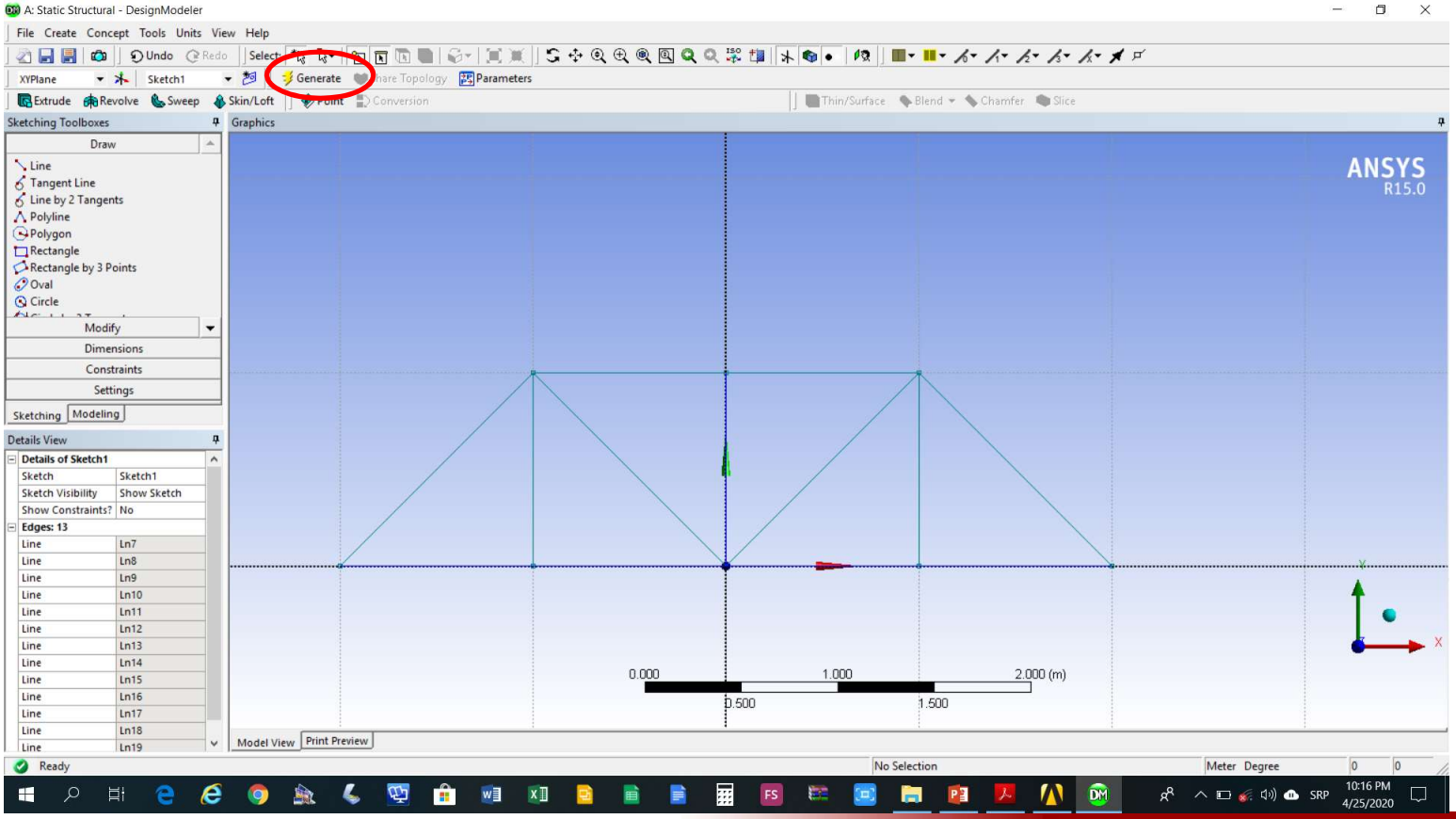
Podesiti parametre mreže i skokovitog kretanja (*Sketching->Settings->Grid*) (*Show in 2D = On*) (*Snap = On*)





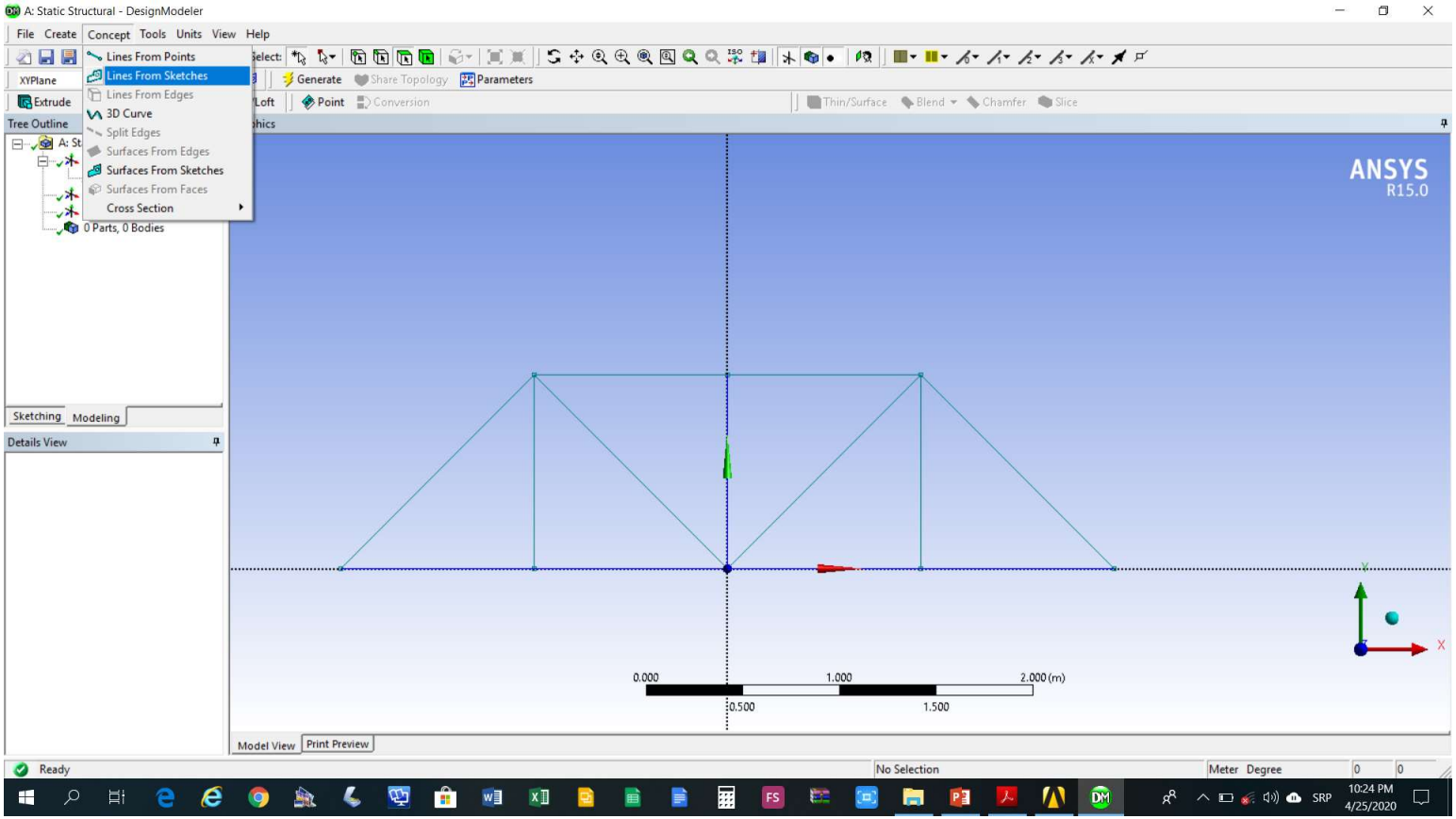
Modeliranje rešetkaste konstrukcije

Nacrtati konstrukciju (*Sketching->Draw->Line*) okončati crtanje skice komandom *Generate*



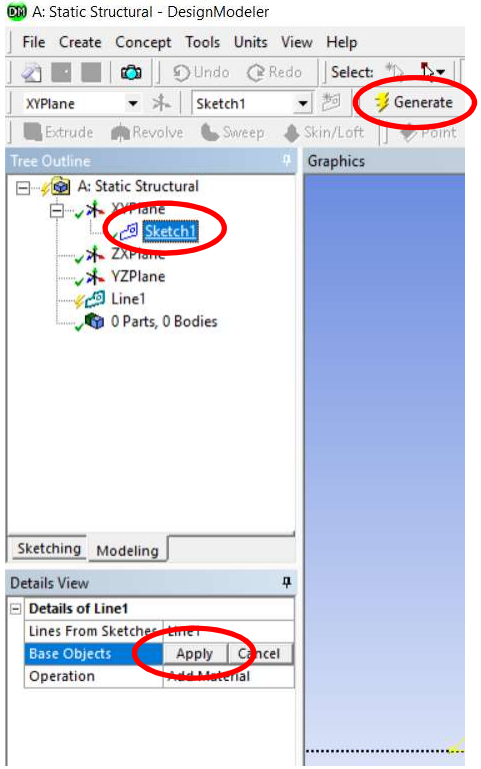
Modeliranje rešetkaste konstrukcije

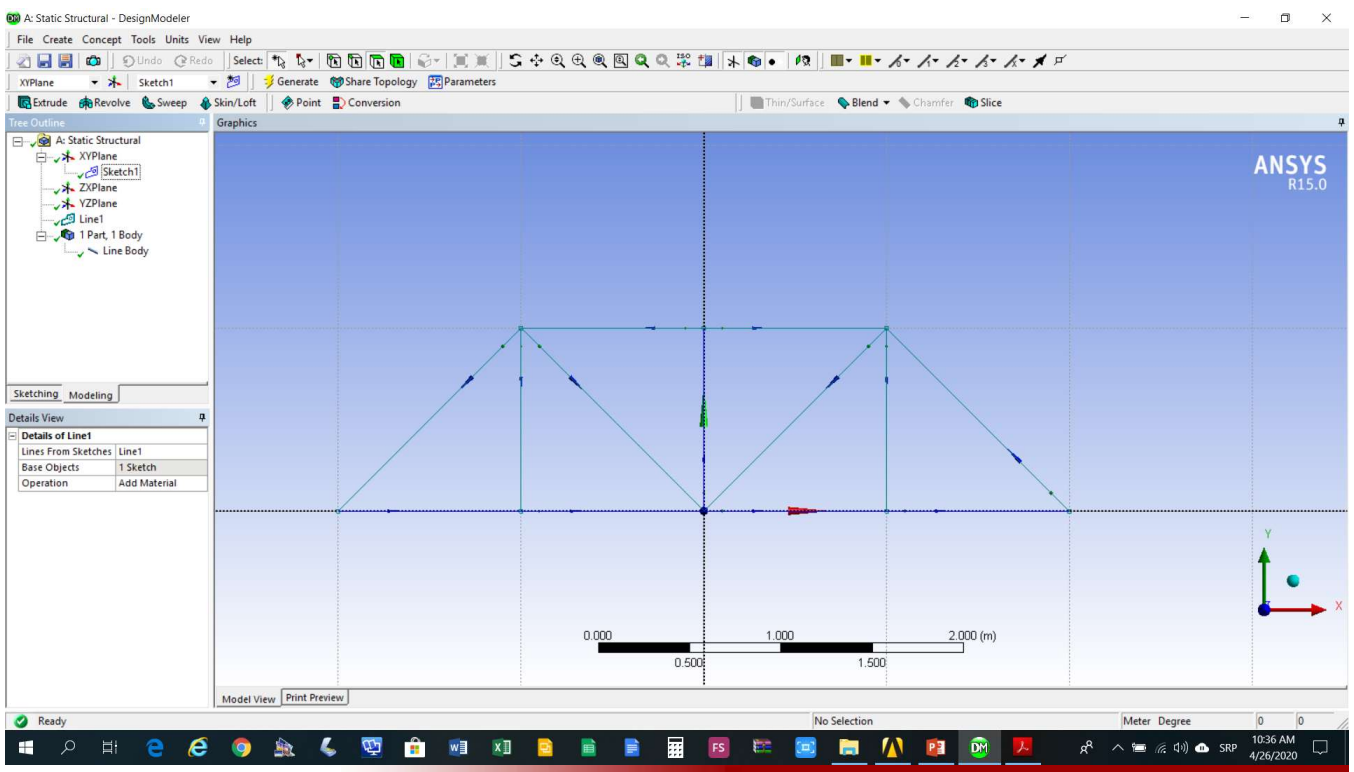
Aktivirati opciju (*Concept->Lines from Sketches*)



Modeliranje rešetkaste konstrukcije

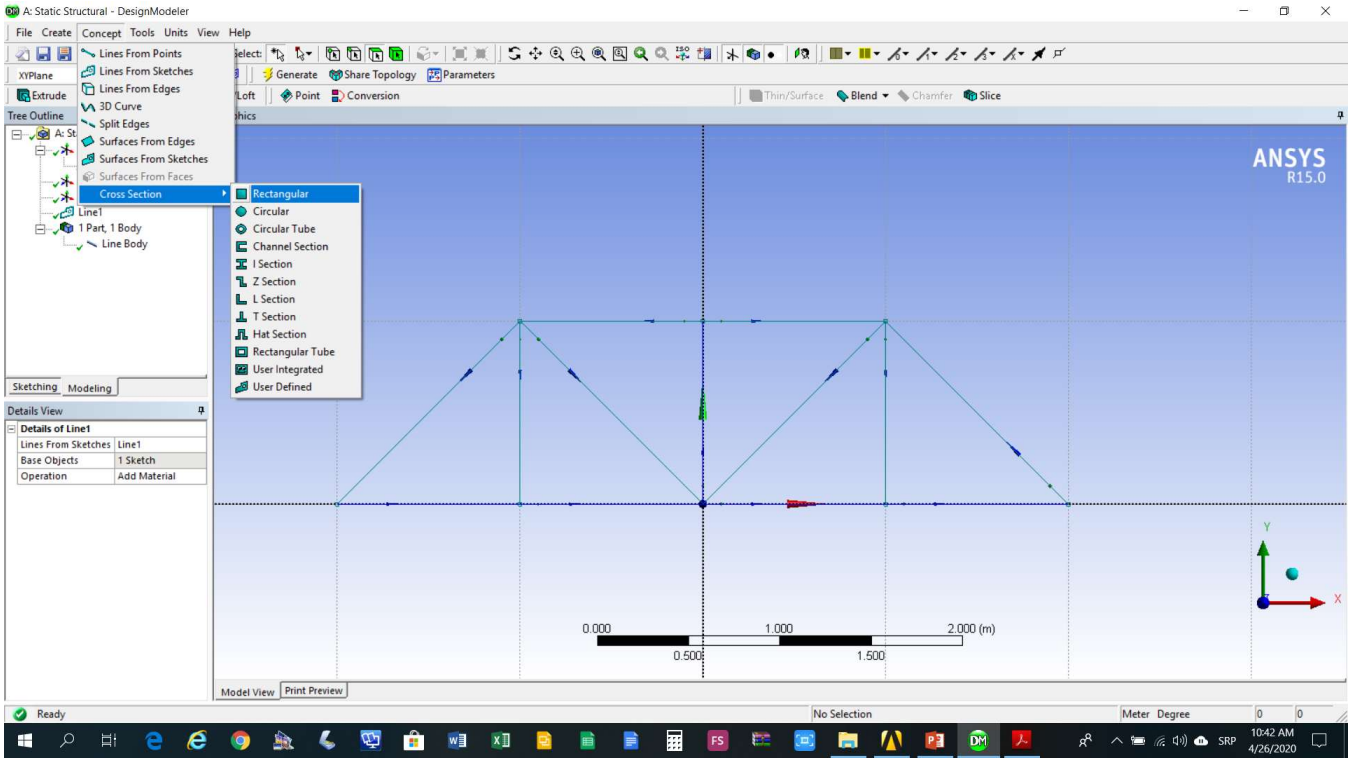
Izabrati skicu *Sketch1* sa stabla modela (*Tree Outline*) i dugme *Detail View->Apply*, okončati kreiranje linijskog tijela opcijom *Generate*





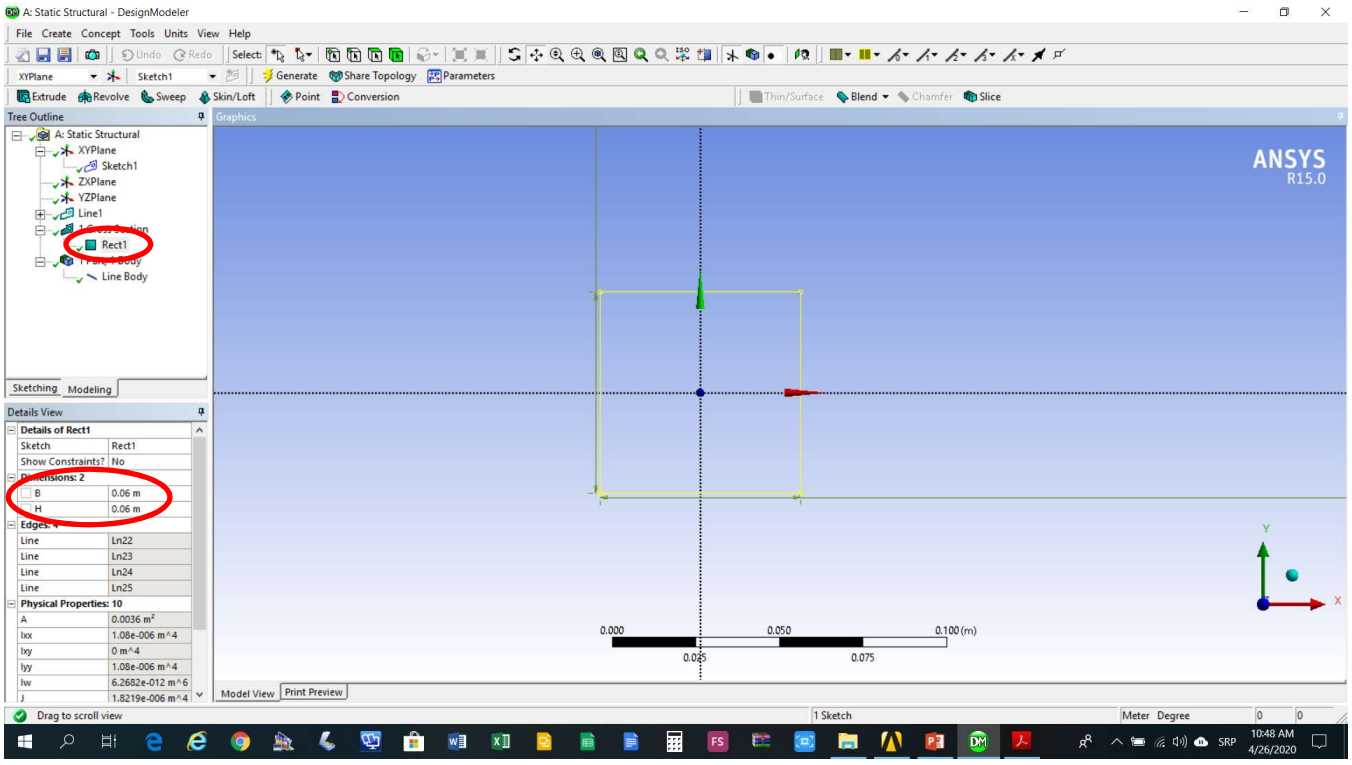
Modeliranje rešetkaste konstrukcije

Kreirati kvadratni poprečni presjek *Rect1* (*Concept->Cross Section->Rectangular*)



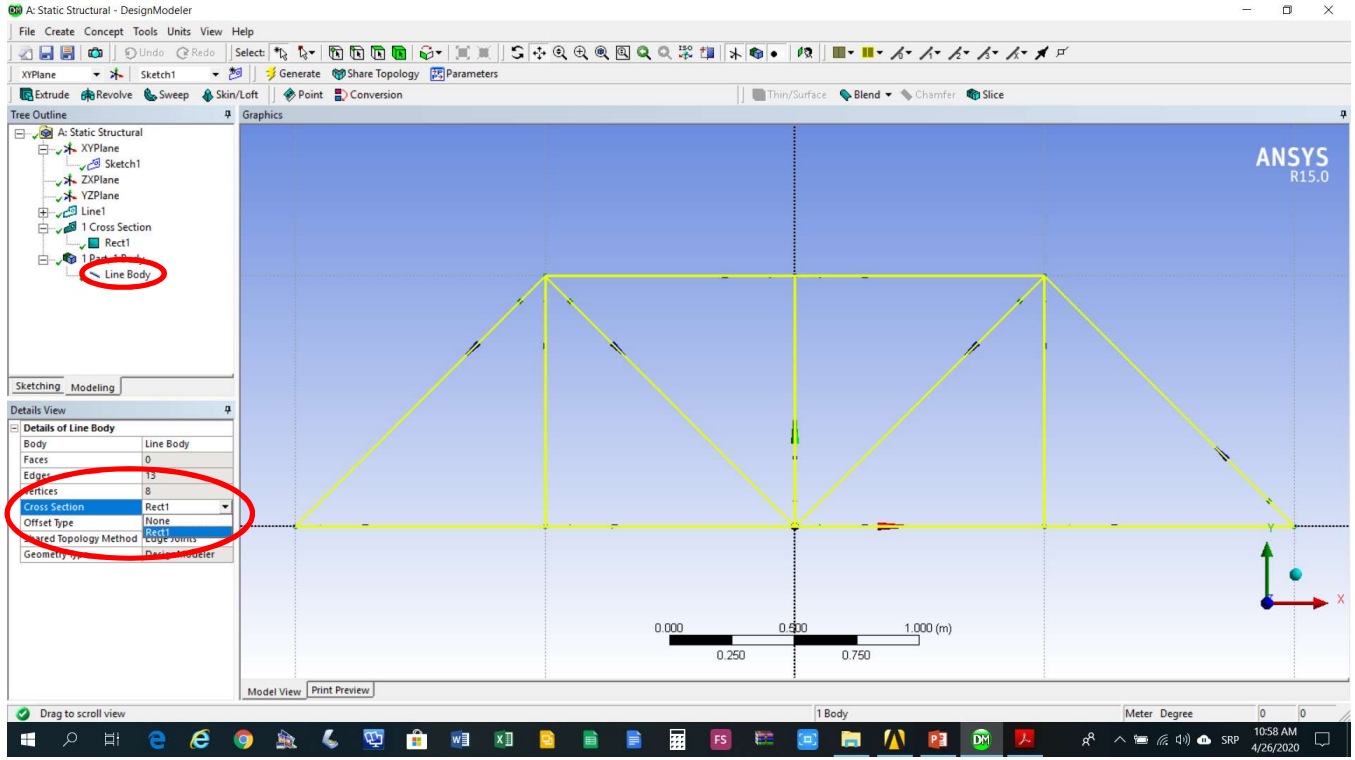
Modeliranje rešetkaste konstrukcije

Podesiti dimenzije poprečnog presjeka *Detail View->B* i *Detail View->H*



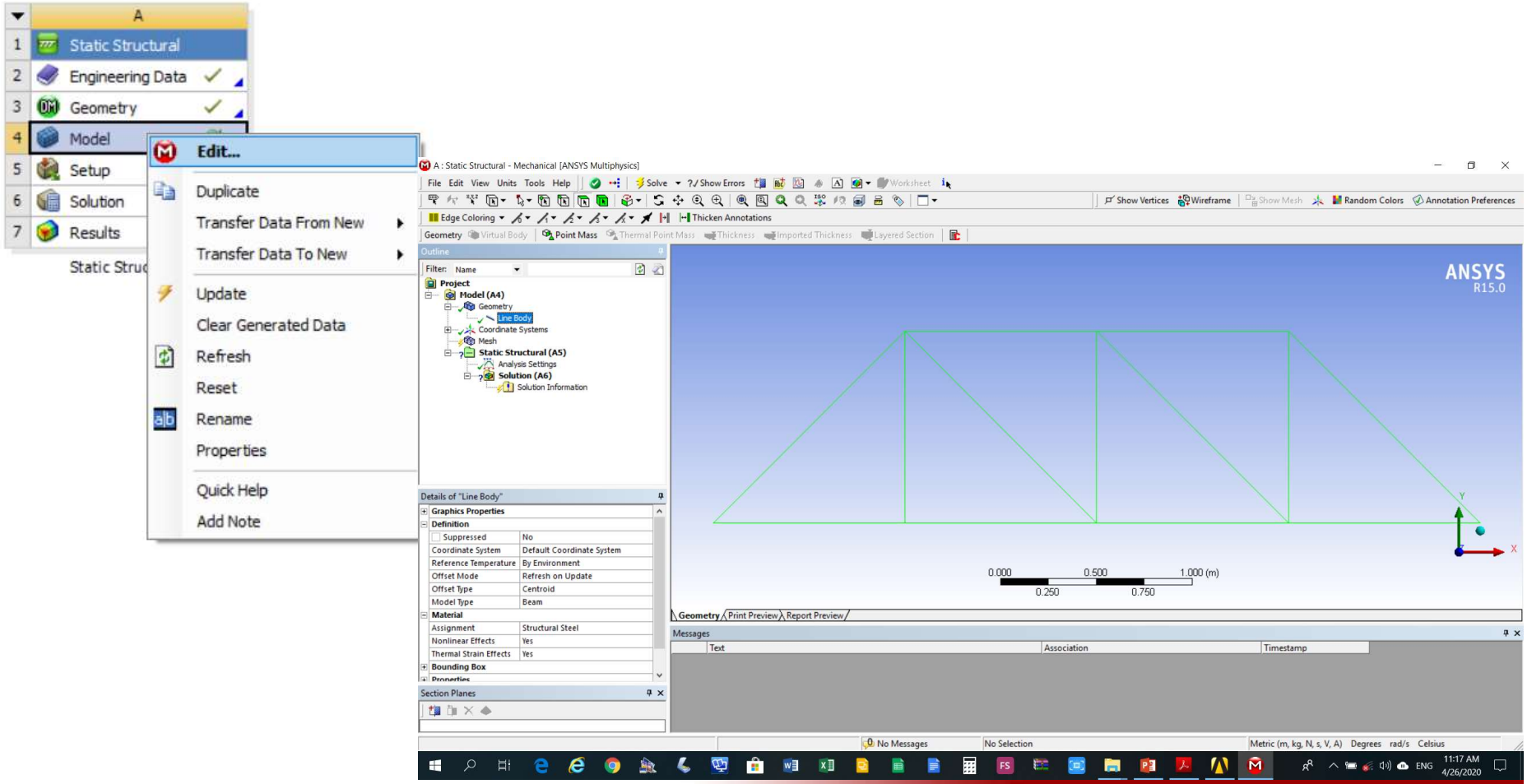
Modeliranje rešetkaste konstrukcije

Izabrati *Line Body* i sa liste *Detail View->Cross Section* izabrati *Rect1* kako bi se elementima konstrukcije dodjelio poprečni presjek



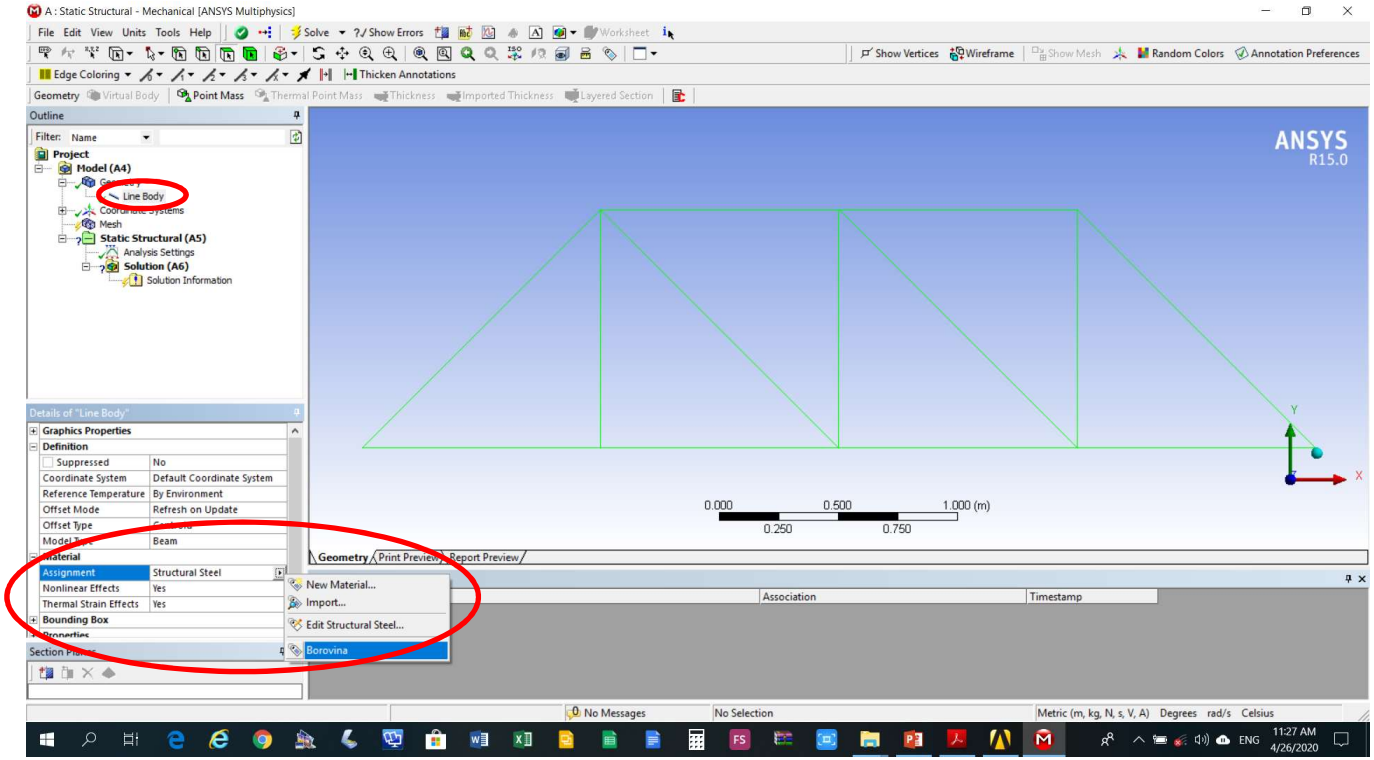
Modeliranje rešetkaste konstrukcije

Aktivirati modul Static Structural *(Model->Edit)*



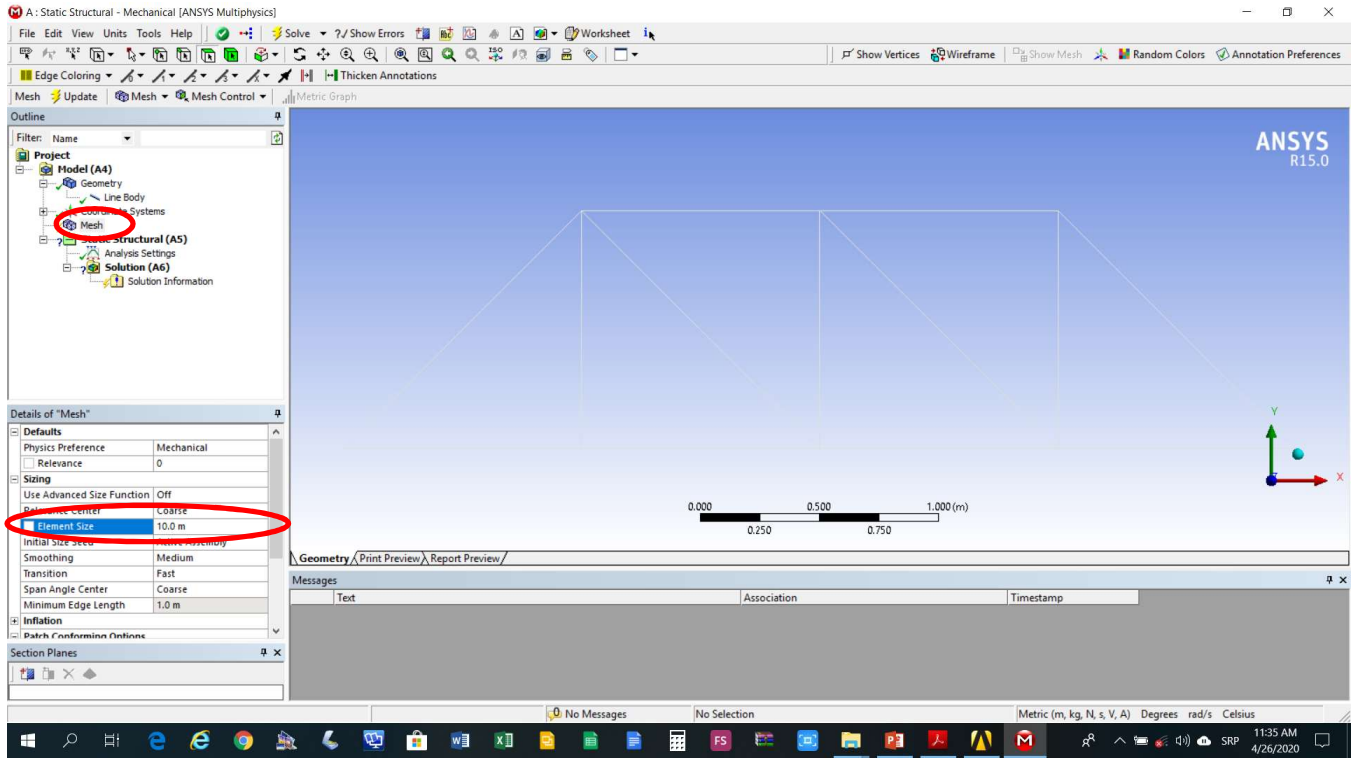
Modeliranje rešetkaste konstrukcije

Dodjeliti materijal elementima konstrukcije *(Details of Line Body->Assignment)*



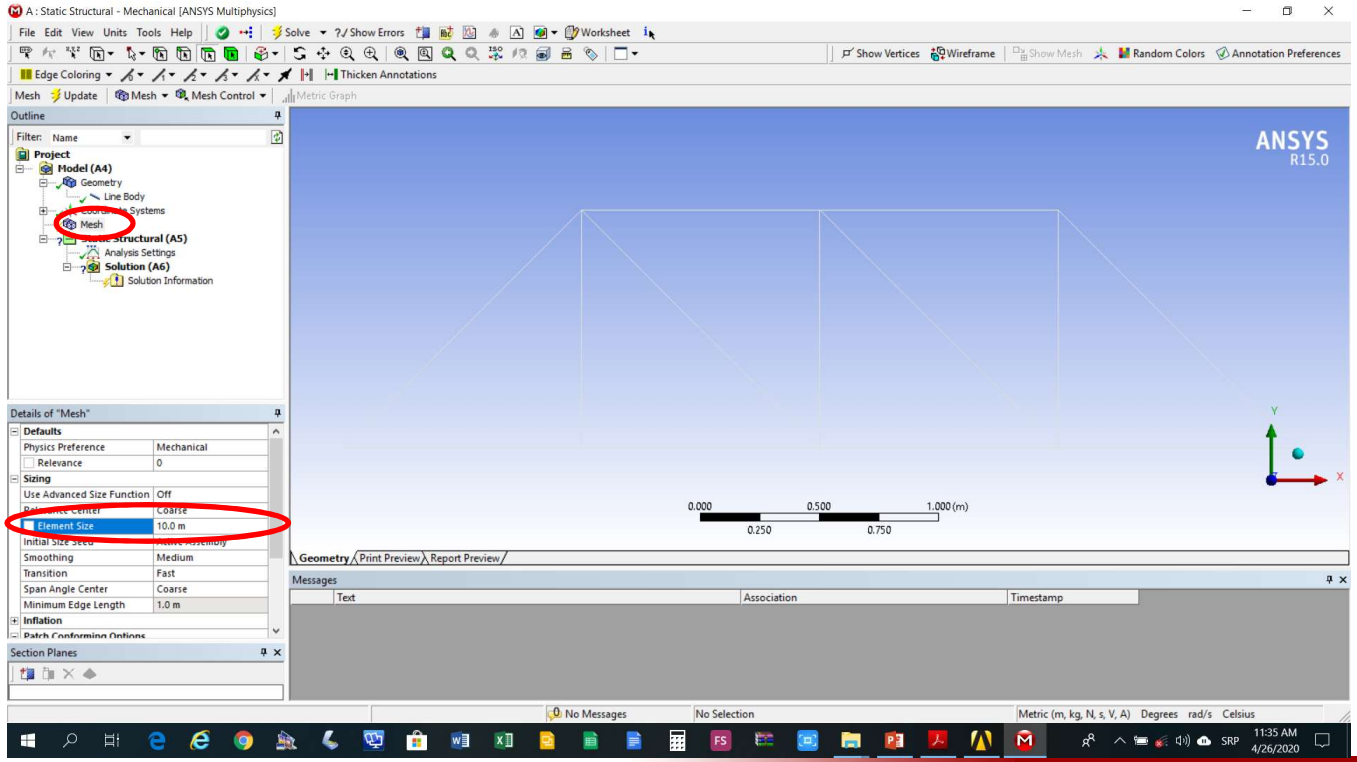
Modeliranje rešetkaste konstrukcije

Zadavanje veličine konačnog elementa *(Details of Mesh->Element Size*)



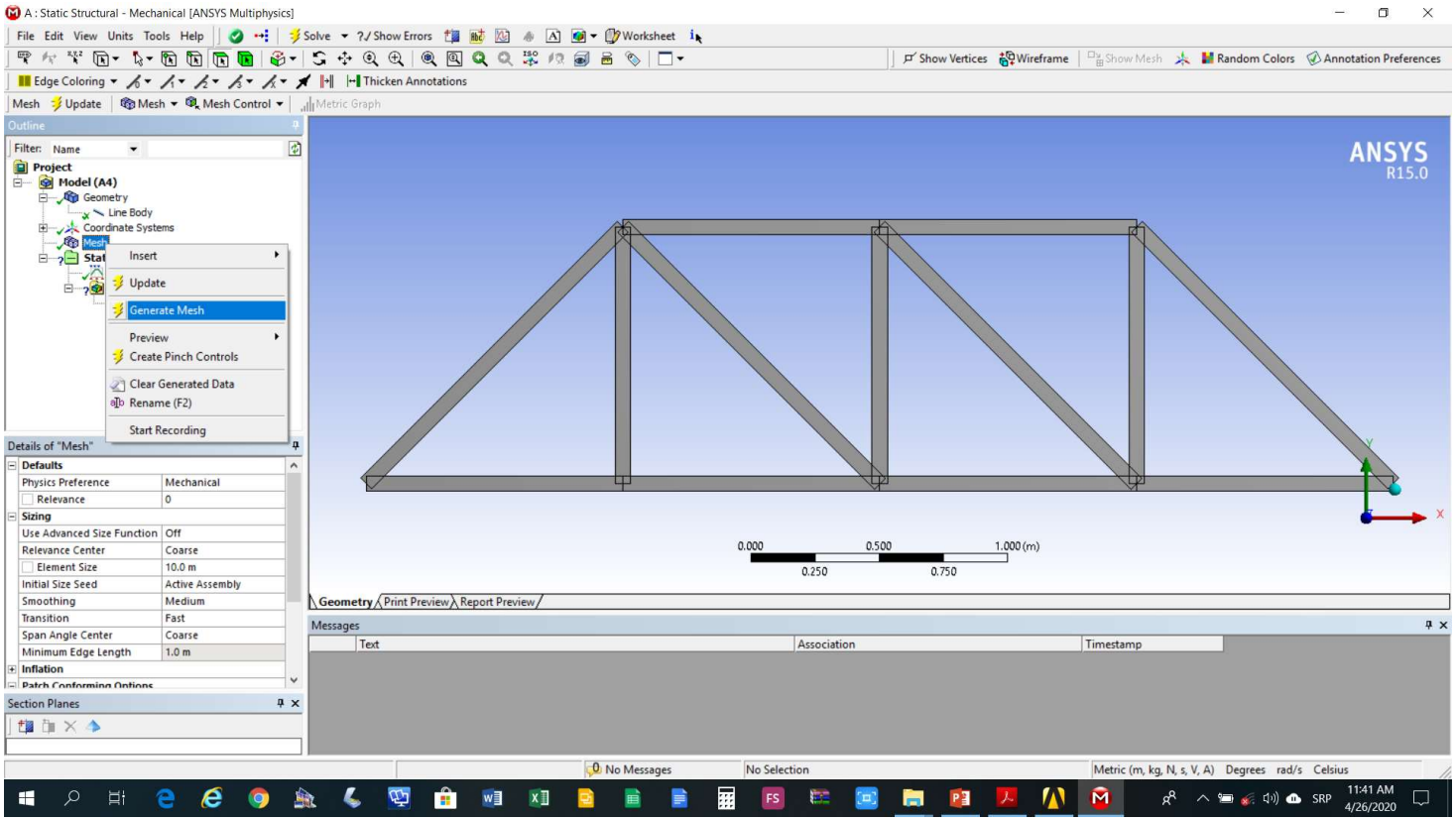
Modeliranje rešetkaste konstrukcije

Zadata veličina konačnog elementa je 10 m kako bi svaki element konstrukcije bio modeliran jednim konačnim elementom



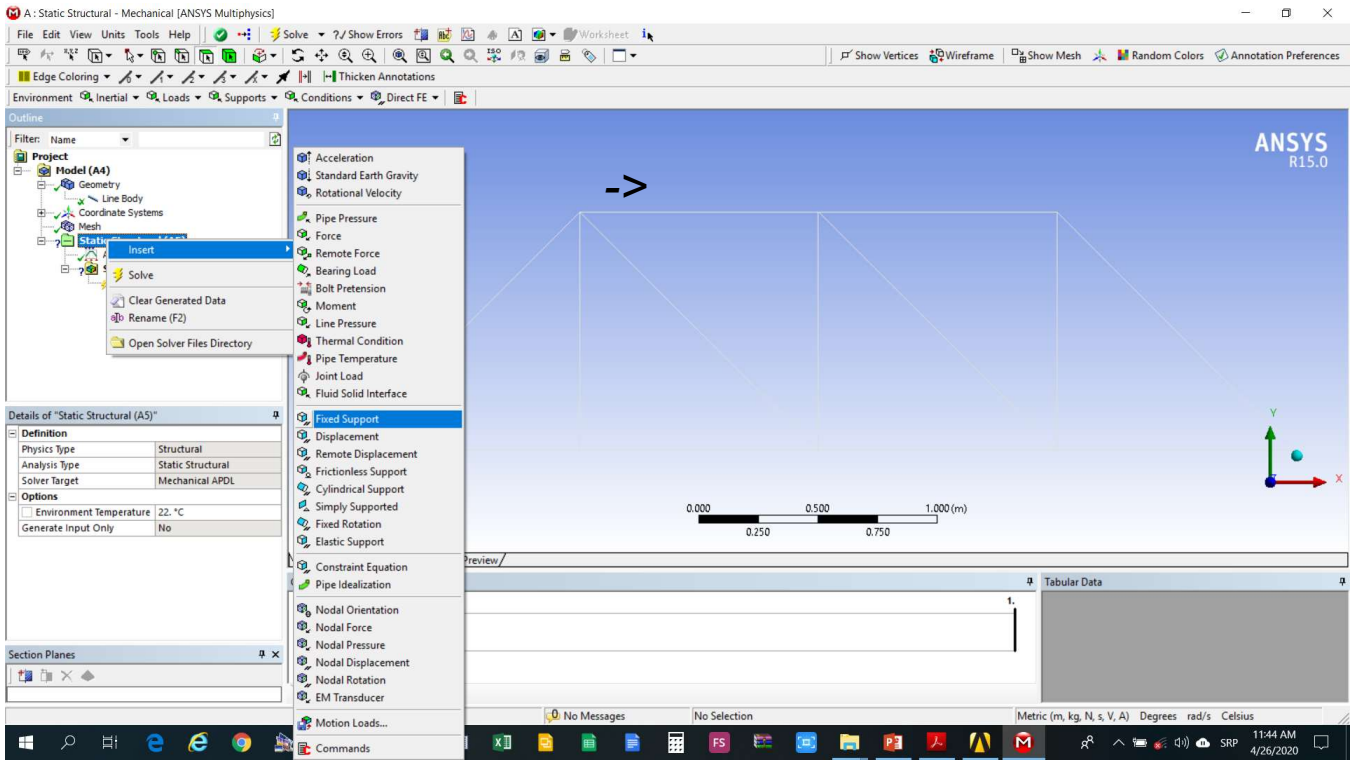
Modeliranje rešetkaste konstrukcije

Generisanje mreže konačnih elemenata *(Mesh-> Generate Mesh*)



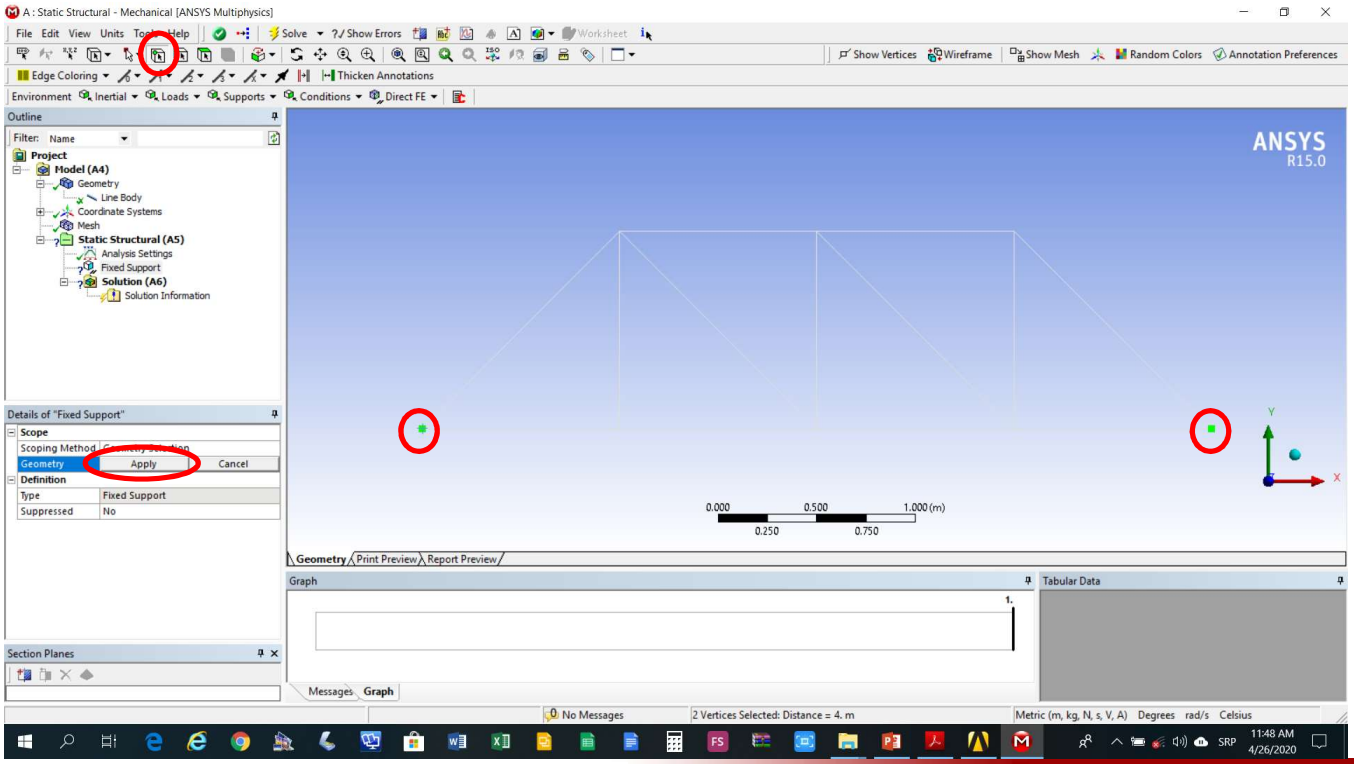
Modeliranje rešetkaste konstrukcije

Dodavanje nepokretnih oslonaca modelu *(Static Structural->Insert->Fixed Support*)



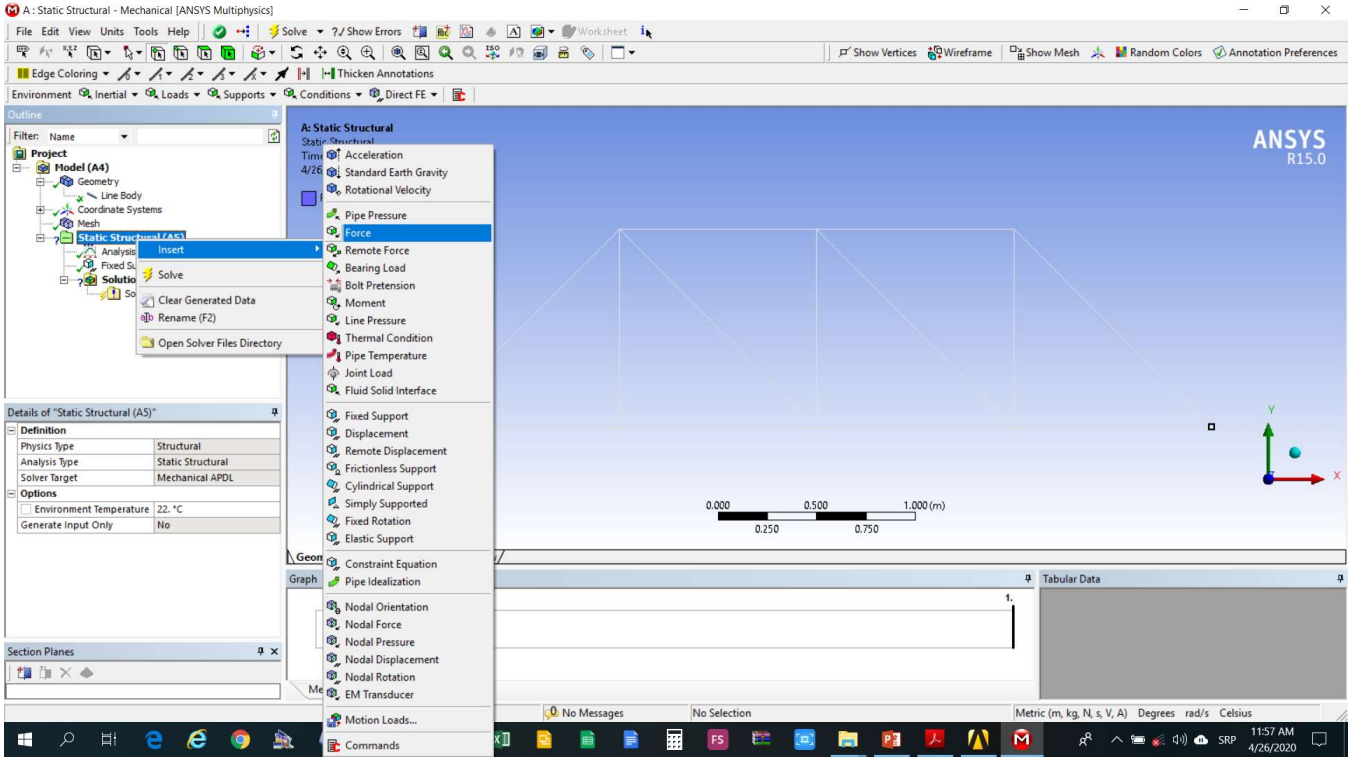
Modeliranje rešetkaste konstrukcije

Izbor položaja nepokretnih oslonaca *(Vertex/Node)* i dugme *Details of Fixed Support->Apply*



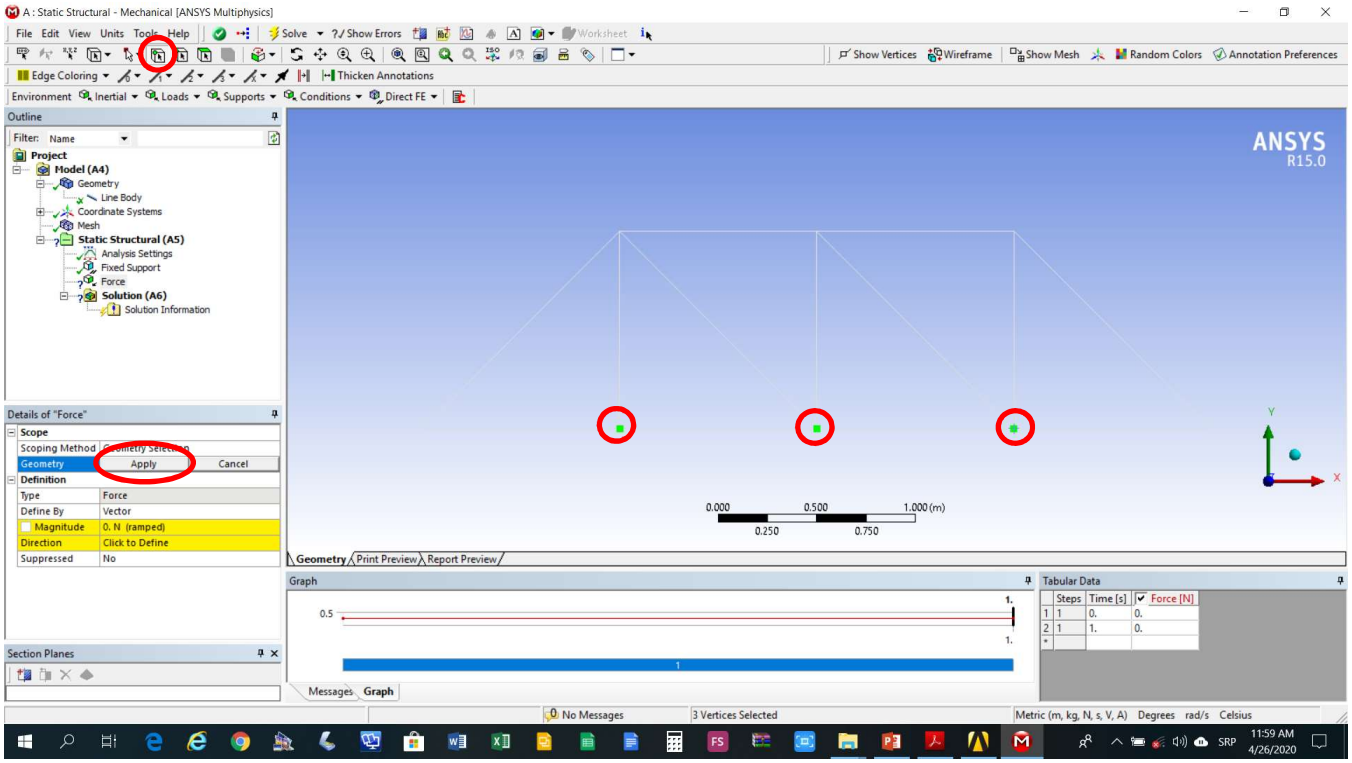
Modeliranje rešetkaste konstrukcije

Dodavanje sila modelu *(Static Structural->Insert->Force)*



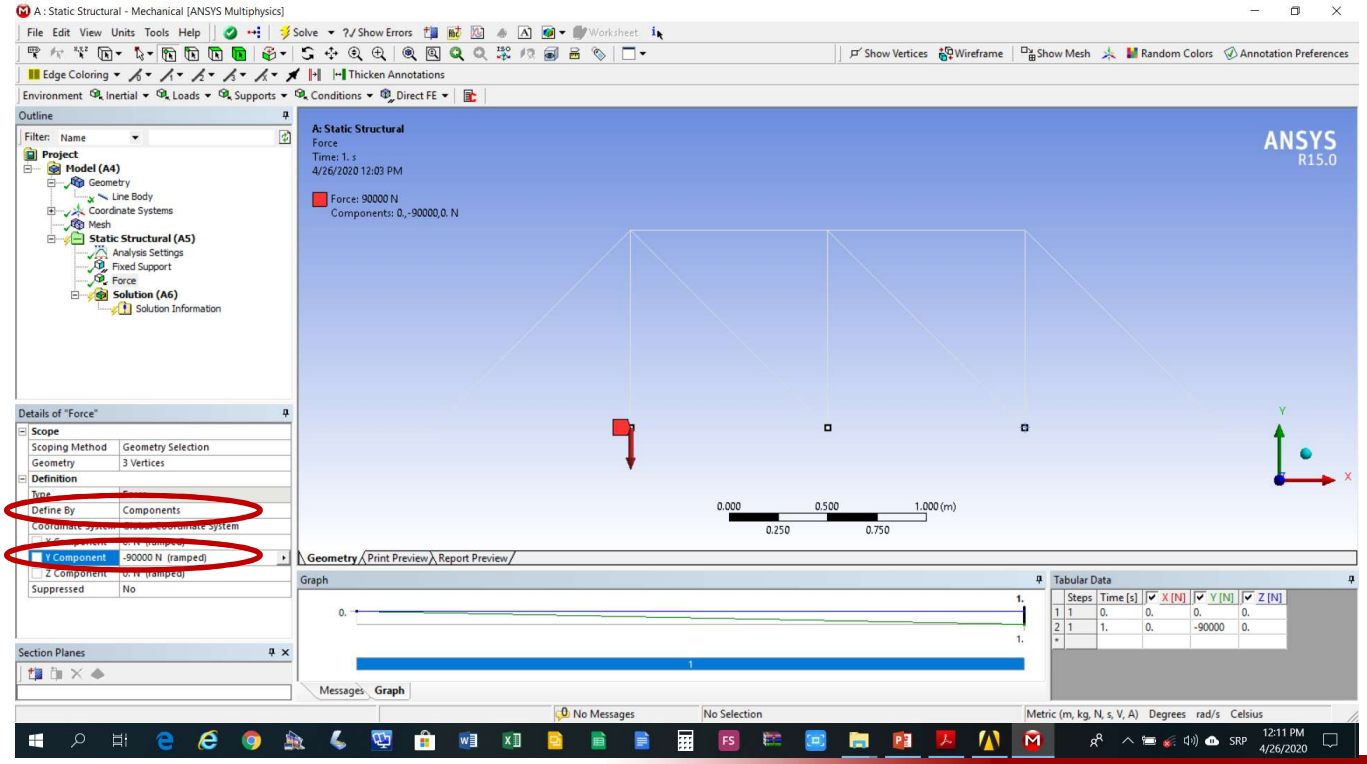
Modeliranje rešetkaste konstrukcije

Izbor položaja napadnih tačaka sila *(Vertex/Node)* i dugme *Details of Force->Apply*



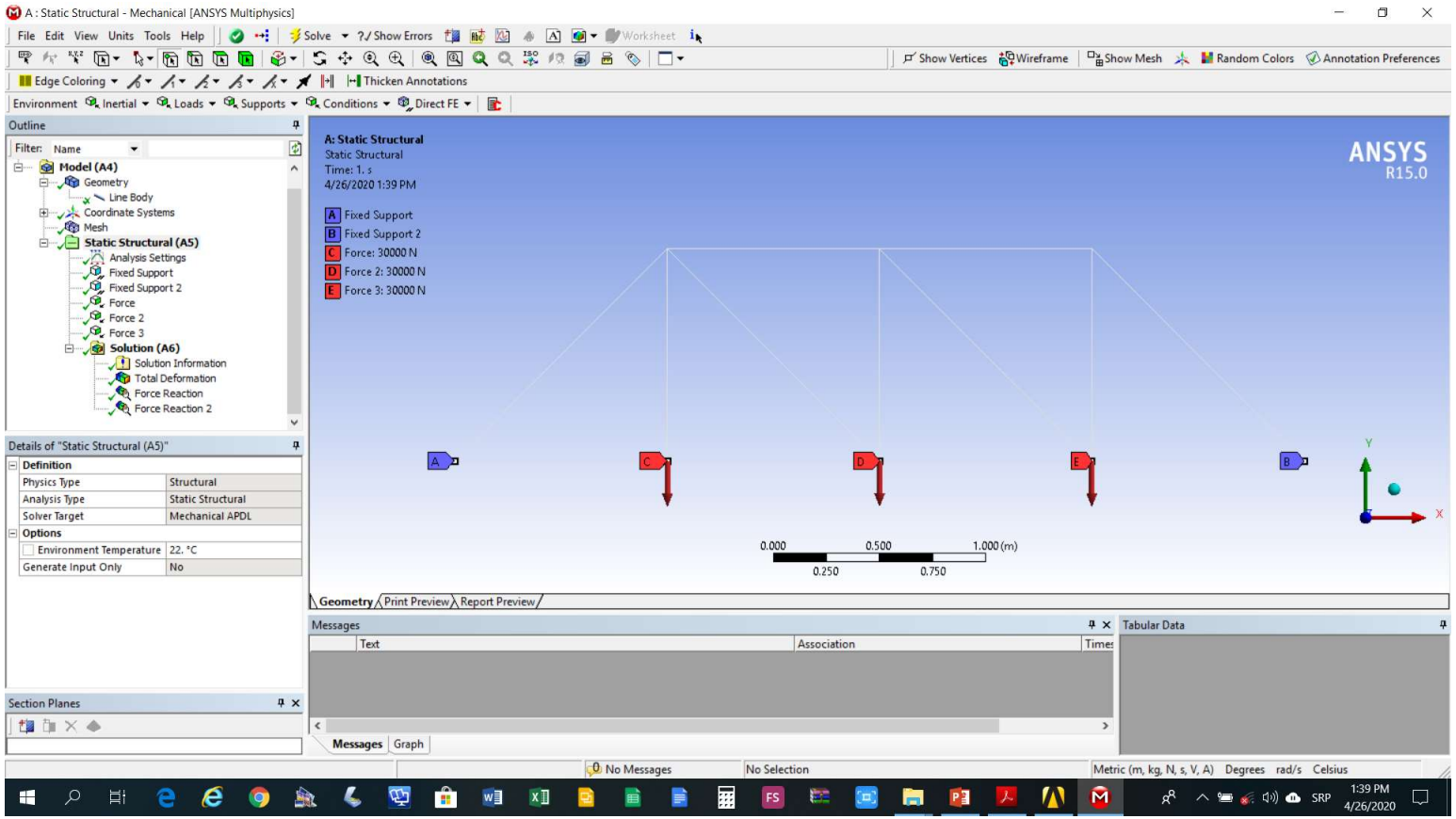
Modeliranje rešetkaste konstrukcije

Zadavanje inteziteta sila: lista *Details of Force->Define by->Components* i polje *Details of Force->Define by->Y Component = -30000N*



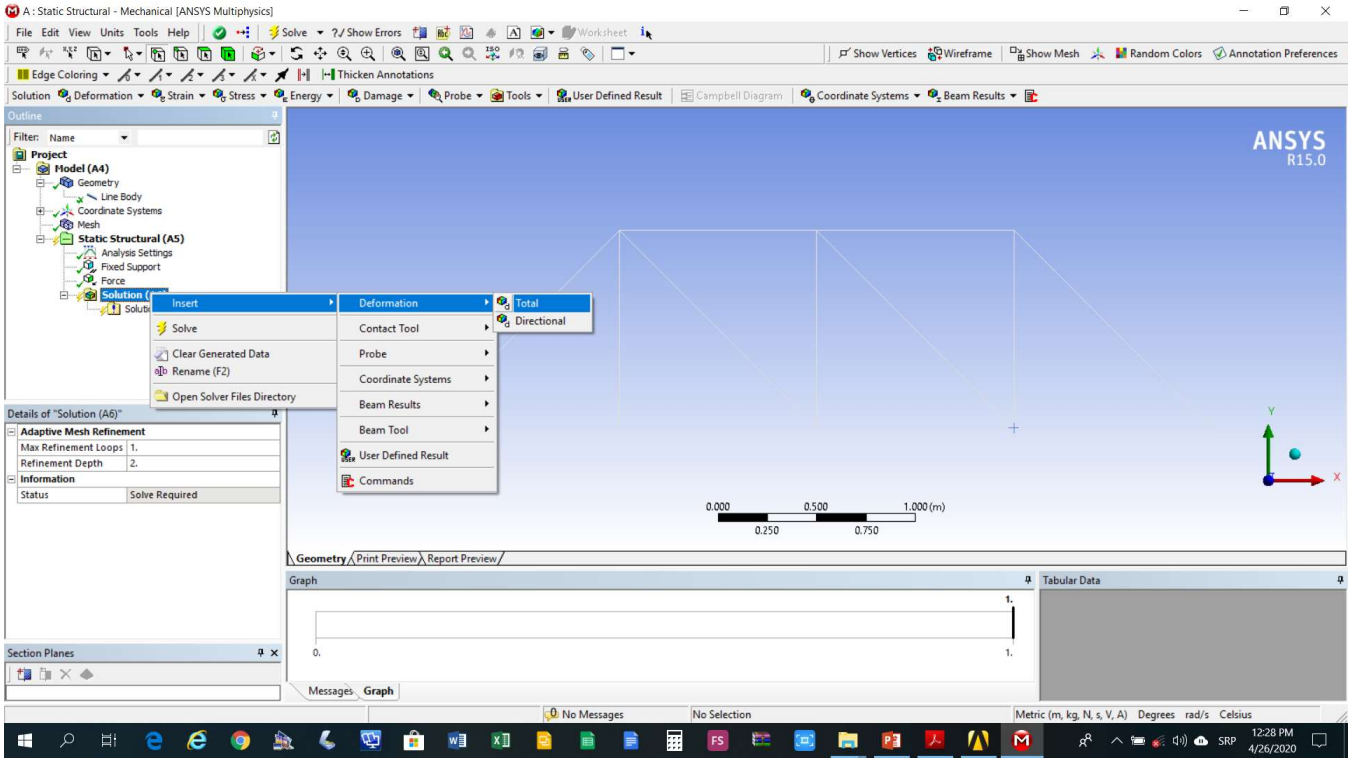
Modeliranje rešetkaste konstrukcije

Oslonci i opterećenje konstrukcije



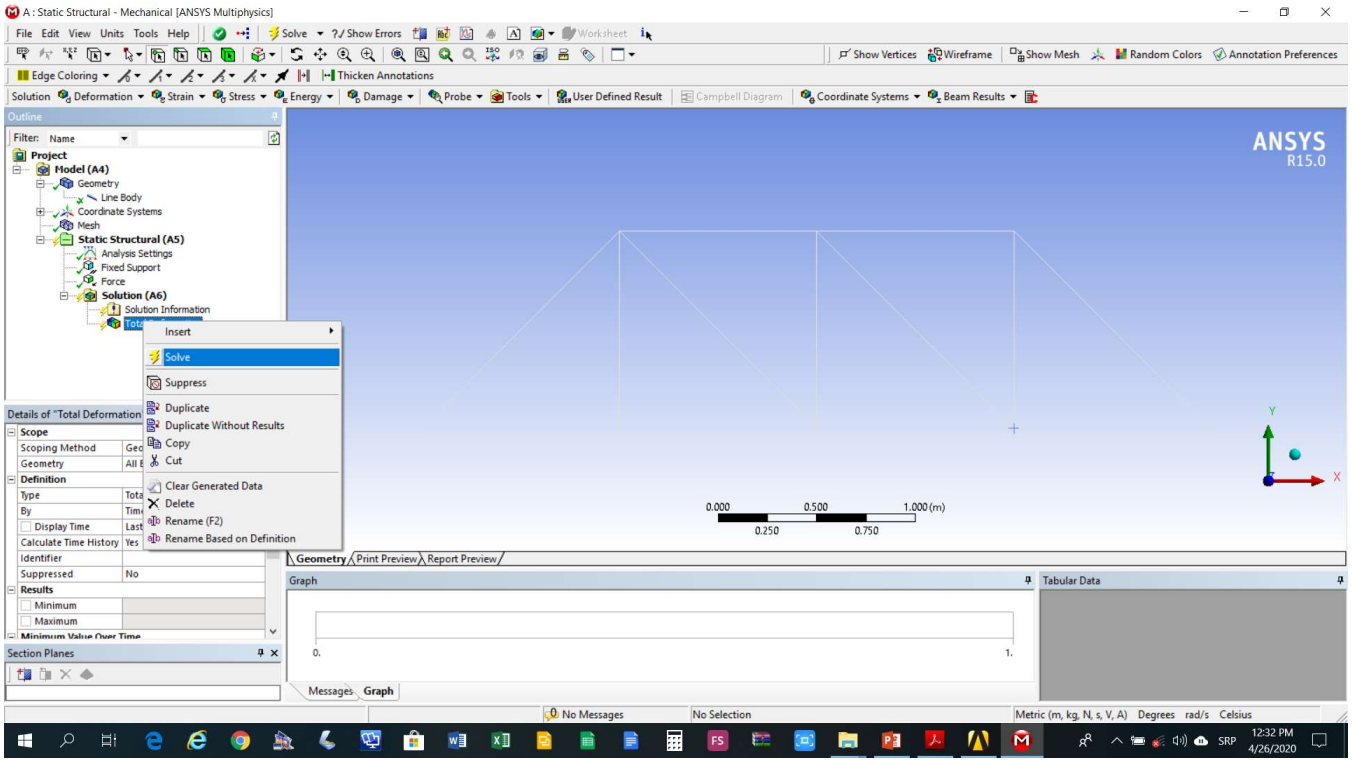
Modeliranje rešetkaste konstrukcije

Izbor analize deformacija konstrukcije *(Solution->Insert->Deformation->Total*)



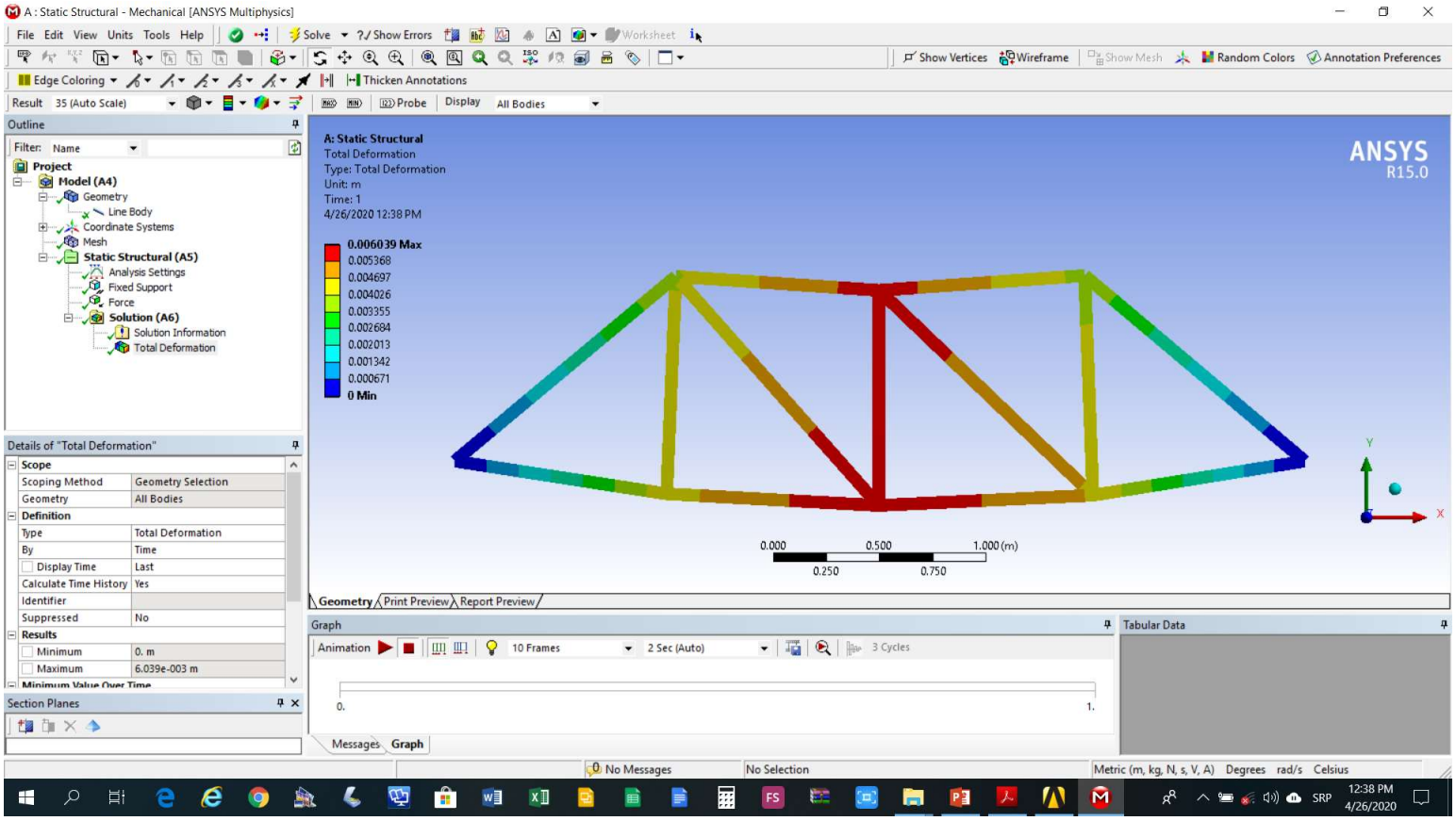
Modeliranje rešetkaste konstrukcije

Aktiviranje analize *(Solution->Total Deformation->Solve)*



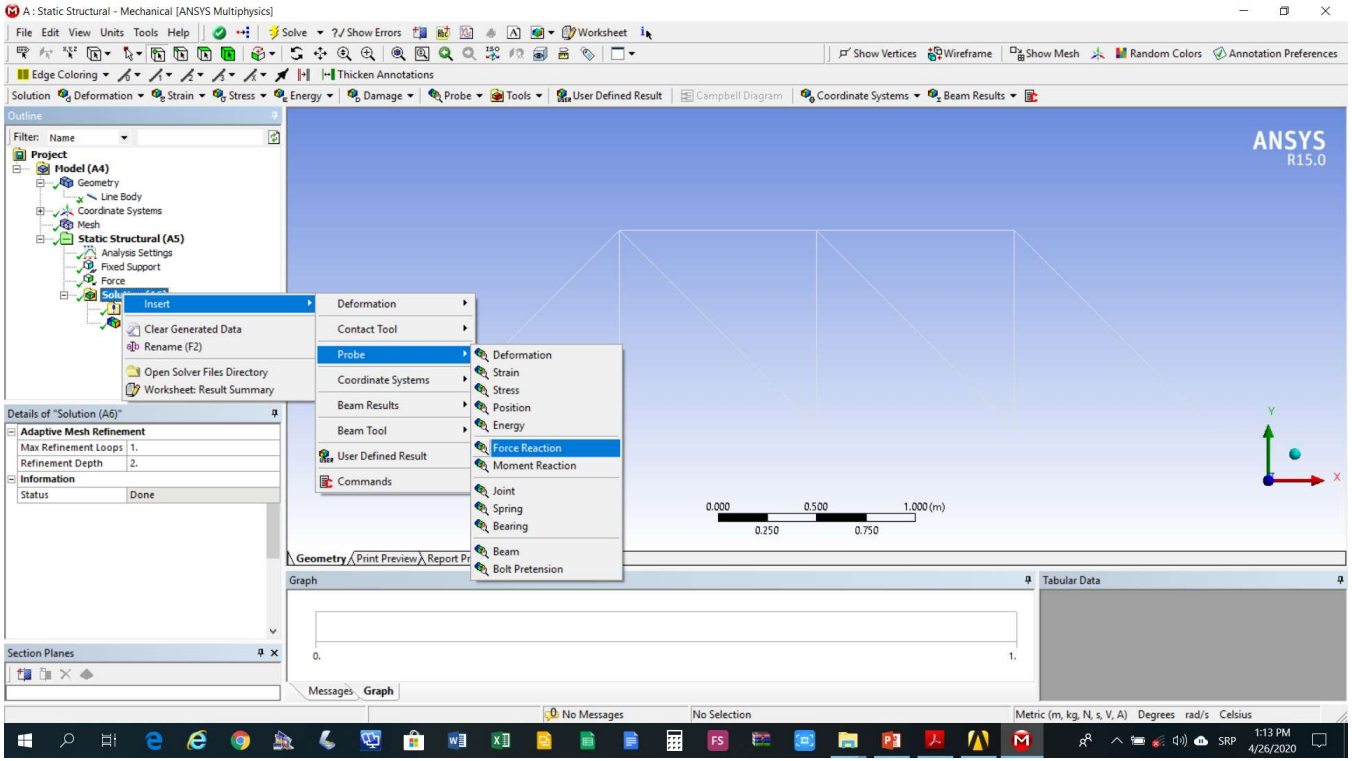
Modeliranje rešetkaste konstrukcije

Rezultati analize deformacija konstrukcije



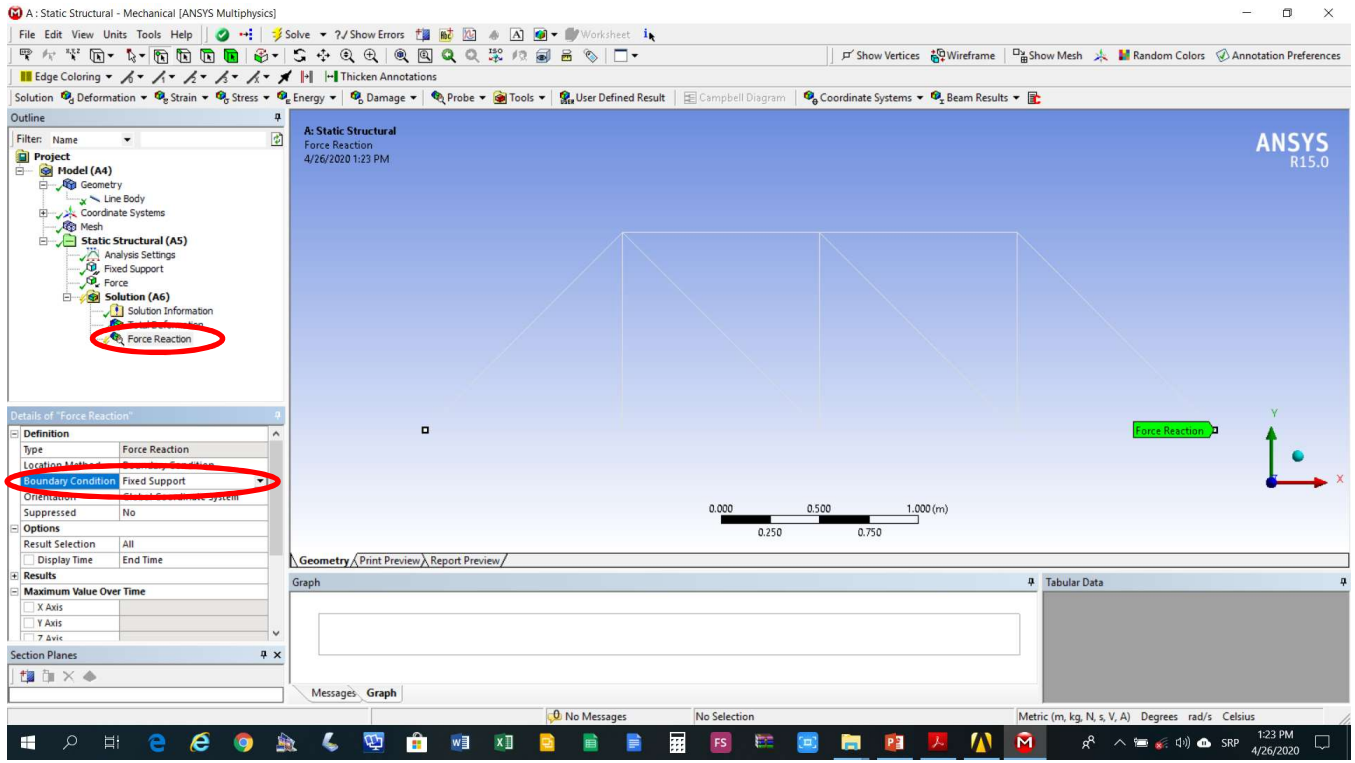
Modeliranje rešetkaste konstrukcije

Očitavanje reakcija oslonaca *(Solution->Insert->Probe->Force Reaction*)



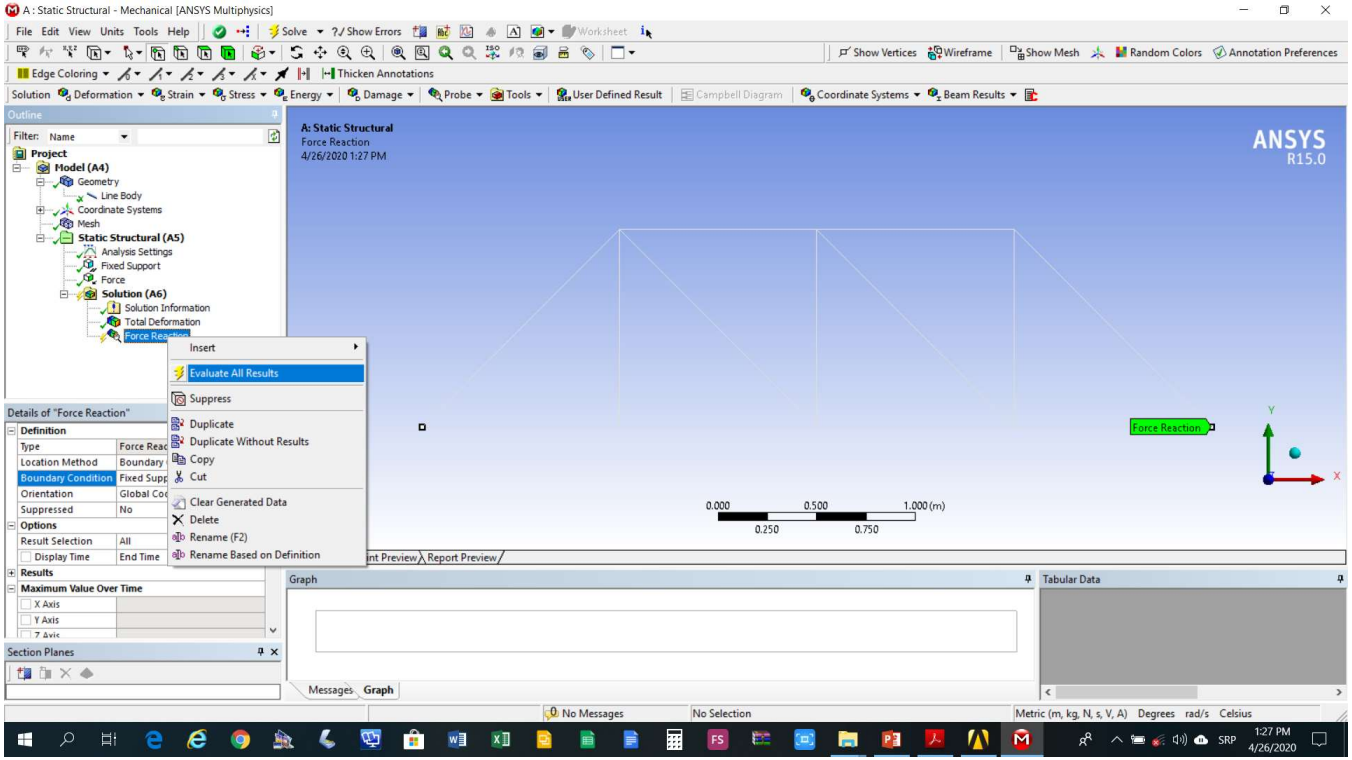
Modeliranje rešetkaste konstrukcije

Izabrati tip oslonca *(Details of Force Reaction->Boundary Condition->Fixed Support)*



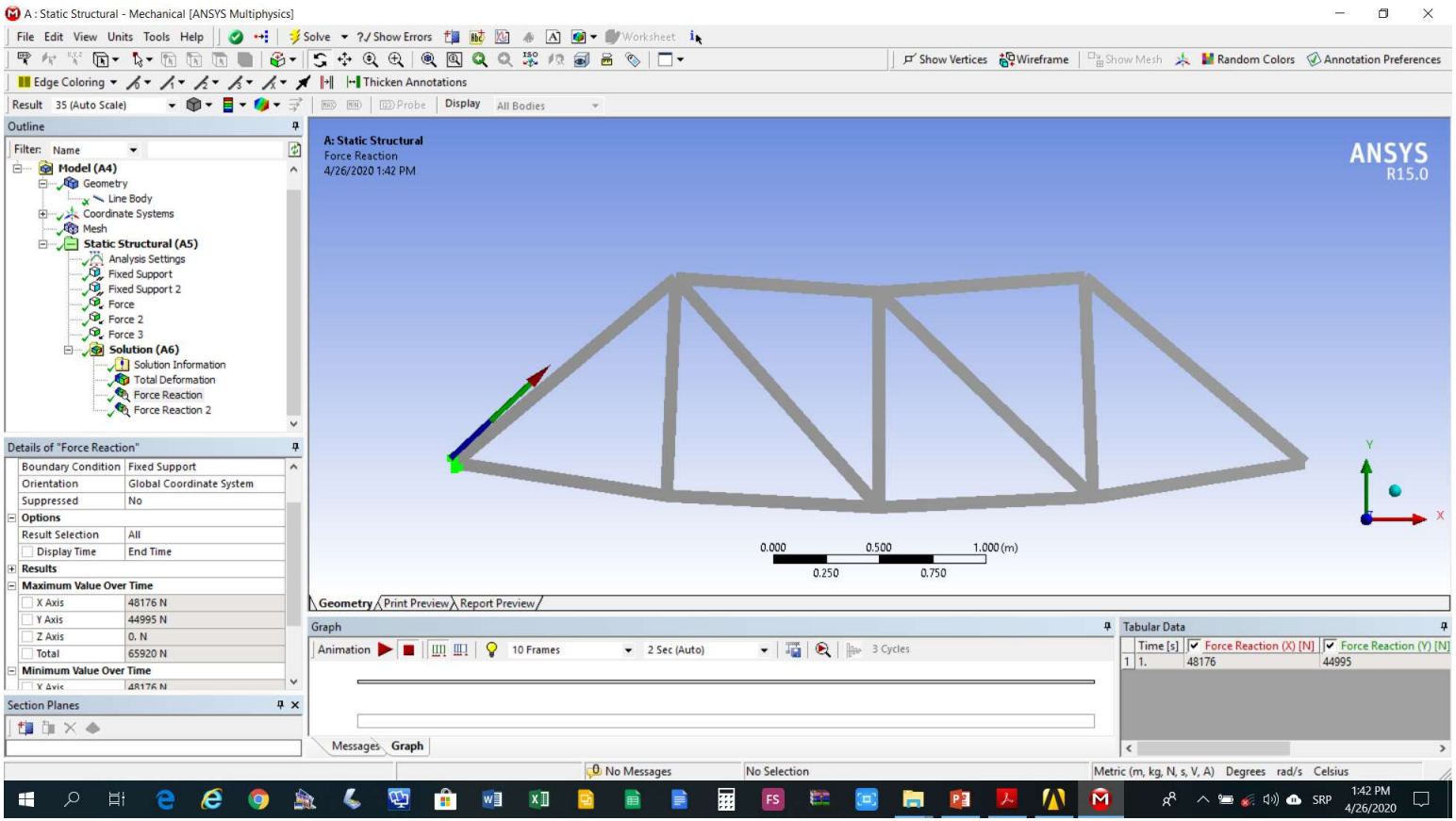
Modeliranje rešetkaste konstrukcije

Aktiviranje očitavanje *(Solution->Force Reaction->Evaluate all Results*)



Modeliranje rešetkaste konstrukcije

Reakcija oslonca



Rešetkaste konstrukcije