



BalticGrid Project

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Deformation calculations of composite structures by ANSYS & Grid

Common practice of design engineers involves numerical modelling in order to substitute expensive physical experiments. With increase of complexity and amount of numerical simulations, engineering design laboratories can not afford to invest in continuous upgrading of their computational power. As a good practice would be to utilize the Grid computation environment for numerical experiments, that would allow fulfilling the amount of required design simulations.

The screenshot displays the Migrating Desktop interface. The Job Submission Wizard window is open, showing a table of arguments for job submission:

Name	Path	Type	Refresh
StdInput		in	
StdOutput	VirtualDirectory/1StdOut.txt	out	
StdError	VirtualDirectory/1StdErr.txt	out	
ls-dyna_perfor...	VirtualDirectory/ansys-node.tgz	in	
IN_1.txt	VirtualDirectory/1IN_1.txt	in	
ansys-node.tgz	VirtualDirectory/1ansys-node.tgz	in	
bindout_1.txt	VirtualDirectory/1bindout_1.txt	out	
messag	VirtualDirectory/1messag	out	

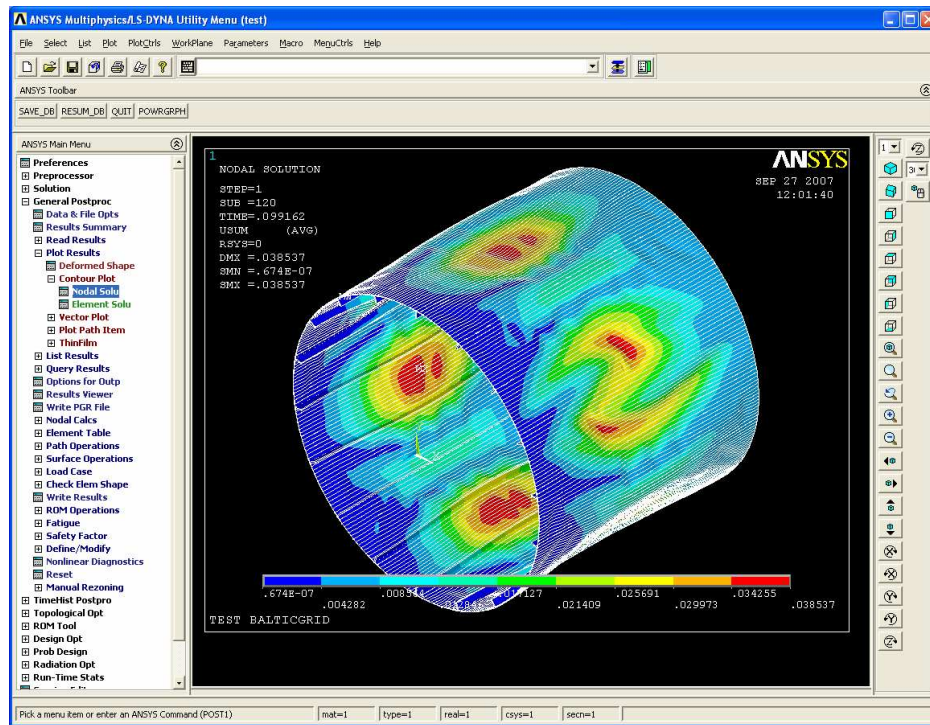
The Job Monitoring Dialog window is also open, showing a table of job status:

Name	ID	Status	Submitted At
ANSYS_LS-DYNA	https://grid3.mif.vu.lt:9000/UXib...	Done	Aug 29, 2007 6:36:15 PM
ANSYS_LS-DYNA	https://grid3.mif.vu.lt:9000/6wif...	Done	Aug 29, 2007 6:36:15 PM
ANSYS_LS-DYNA	https://grid3.mif.vu.lt:9000/s2xo...	Done	Aug 29, 2007 6:36:15 PM
ANSYS_LS-DYNA	https://grid3.mif.vu.lt:9000/5Tgk...	Running	Aug 29, 2007 6:36:15 PM
ANSYS_LS-DYNA	https://grid3.mif.vu.lt:9000/OyL...	Running	Aug 29, 2007 6:36:15 PM
ANSYS_LS-DYNA	[temporary id: 1189680614910...	Submitted	Aug 29, 2007 6:36:15 PM

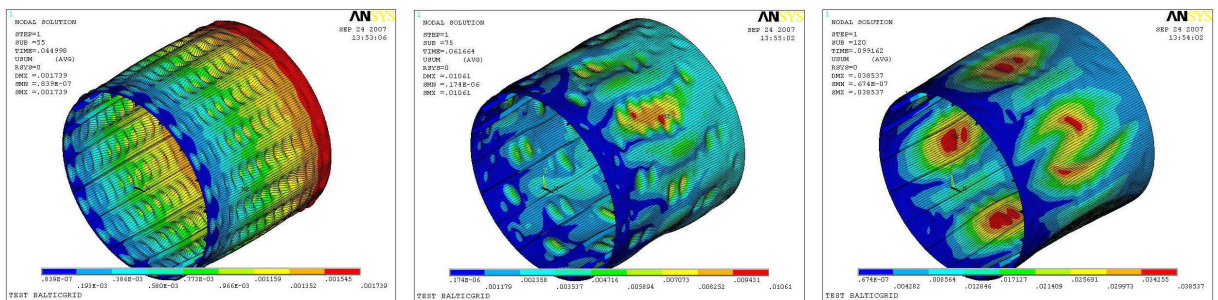
At the bottom of the Job Monitoring Dialog, it shows 'Total Jobs: 6' and 'Selected Jobs: 0'. Buttons for 'Select All', 'Unselect All', 'Invert sel.', 'Details', 'Cancel', 'Delete', 'Visualize', 'Resubmit', 'Update', 'Close', and 'Help' are visible.

Riga Technical University, Institute of Material Sciences (RTU IMS) has asked Institute of Mathematics and Informatics, University of Latvia (IMCS UL) to help with adjusting the Commercial finite element code ANSYS to work in the Grid environment. In everyday praxis ANSYS code has been applied by RTU IMS to design the composite structures, which by its nature is time demanding process.

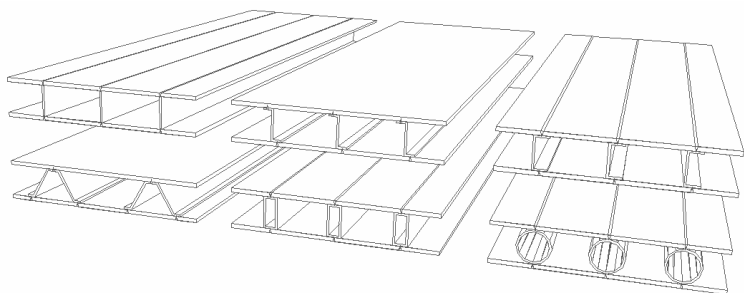
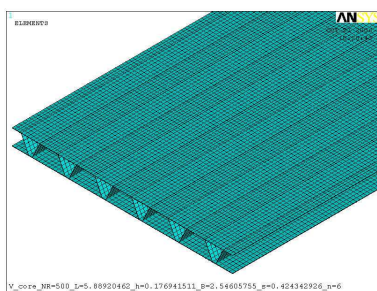




At the current state ANSYS/LS-DYNA executable module, has been implemented for numerical simulation in Grid by utilizing the Migrating Desktop environment. That allows performing sampling of input variables for determining load carrying capacity for composite structures.



In the example you can see Carbon-fiber reinforced fuselage structure of the airplane, sampling the radius of the structure, length, number of stiffeners and stiffener height as numerical variables.



In another example you can see sandwich deck panel for ship structure, sampling the core stiffener type, length of the panel, number of core stiffeners, stiffener height and plate thicknesses as numerical variables.

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