



Değişken Kalınlıklı İzotrop Plakların ANSYS Paket Programı ile Modellenmesi

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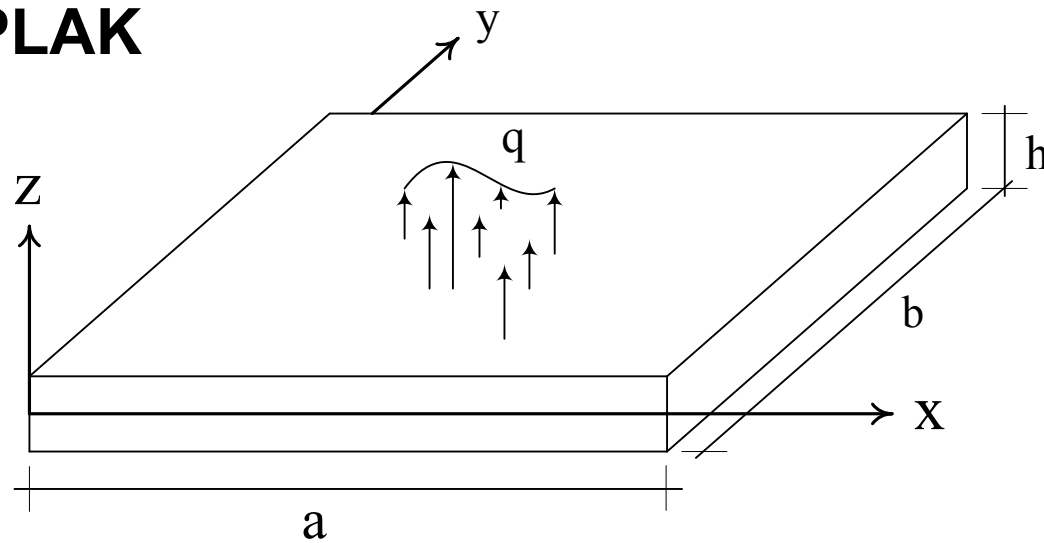
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İZOTROP PLAK



$$\frac{q}{D} = \frac{\partial^4 w_0}{\partial x^4} + 2 \frac{\partial^4 w_0}{\partial x^2 \partial y^2} + \frac{\partial^4 w_0}{\partial y^4}$$

$$D = \frac{Eh^3}{12(1-\nu^2)}$$



DEĞİŞKEN KALINLIK

$$h = h_0 [1 + \lambda f_n(y)]$$

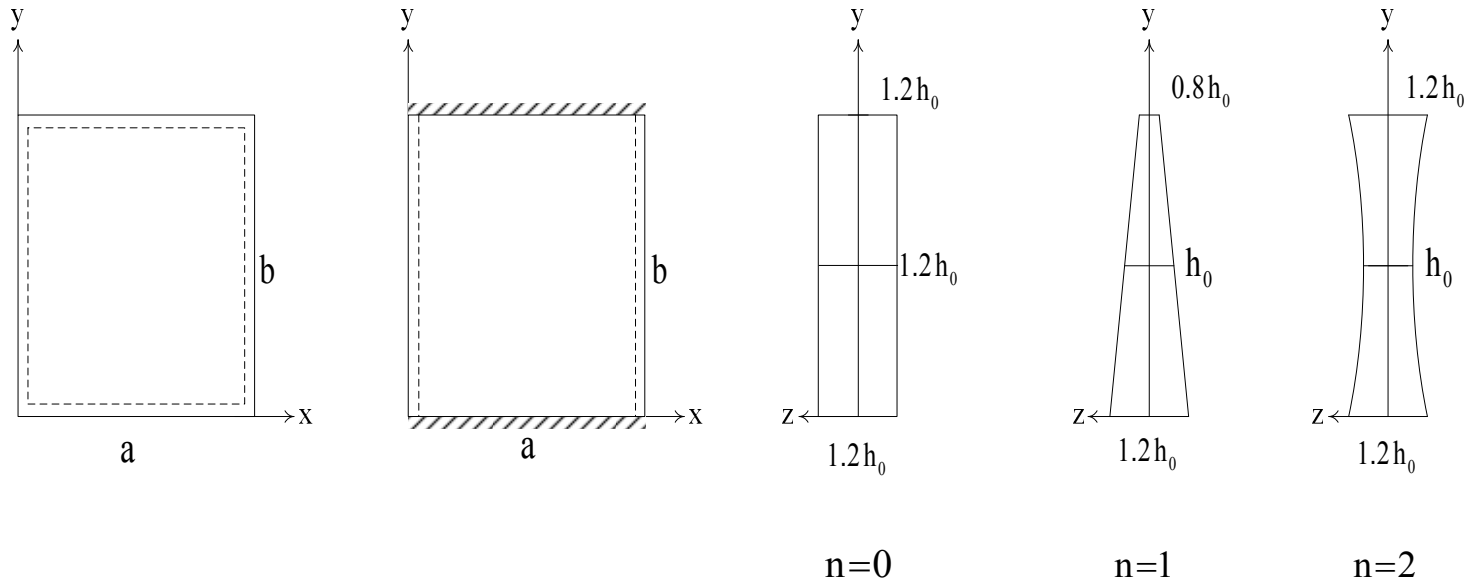
$$f_n(y) = (2\bar{y} - 1)^n \quad n = 1, 2, 3, \dots$$

$$\bar{y} = y/b$$

$$\lambda = 0.2$$

$$h_0 = a / 20$$

DEĞİŞKEN KALINLIKLI İZOTROP PLAK



ANalysis SYStem

The screenshot displays the ANSYS Multiphysics Utility Menu (1_0) interface. The main window has a menu bar with options: File, Select, List, Plot, PlotCtrls, WorkPlane, Parameters, Macro, MenuCtrls, and Help. Below the menu bar is a toolbar with icons for file operations and a search field. The ANSYS Toolbar contains buttons for SAVE_DB, RESUM_DB, QUIT, and POWRGRPH. The ANSYS Main Menu is visible on the left, listing various options such as Preferences, Preprocessor, Solution, General Postproc, TimeHist Postpro, Topological Opt, ROM Tool, Design Opt, Prob Design, Radiation Opt, Run-Time Stats, Session Editor, and Finish. The central workspace shows a dialog box titled "Preferences for GUI Filtering" with the following content:

Preferences for GUI Filtering
[KEYW]/[PMETH] Preferences for GUI Filtering
Individual discipline(s) to show in the GUI

- Structural
- Thermal
- ANSYS Fluid
- FLOTRAN CFD

Electromagnetic:

- Magnetic-Nodal
- Magnetic-Edge
- High Frequency
- Electric

Note: If no individual disciplines are selected they will all show.

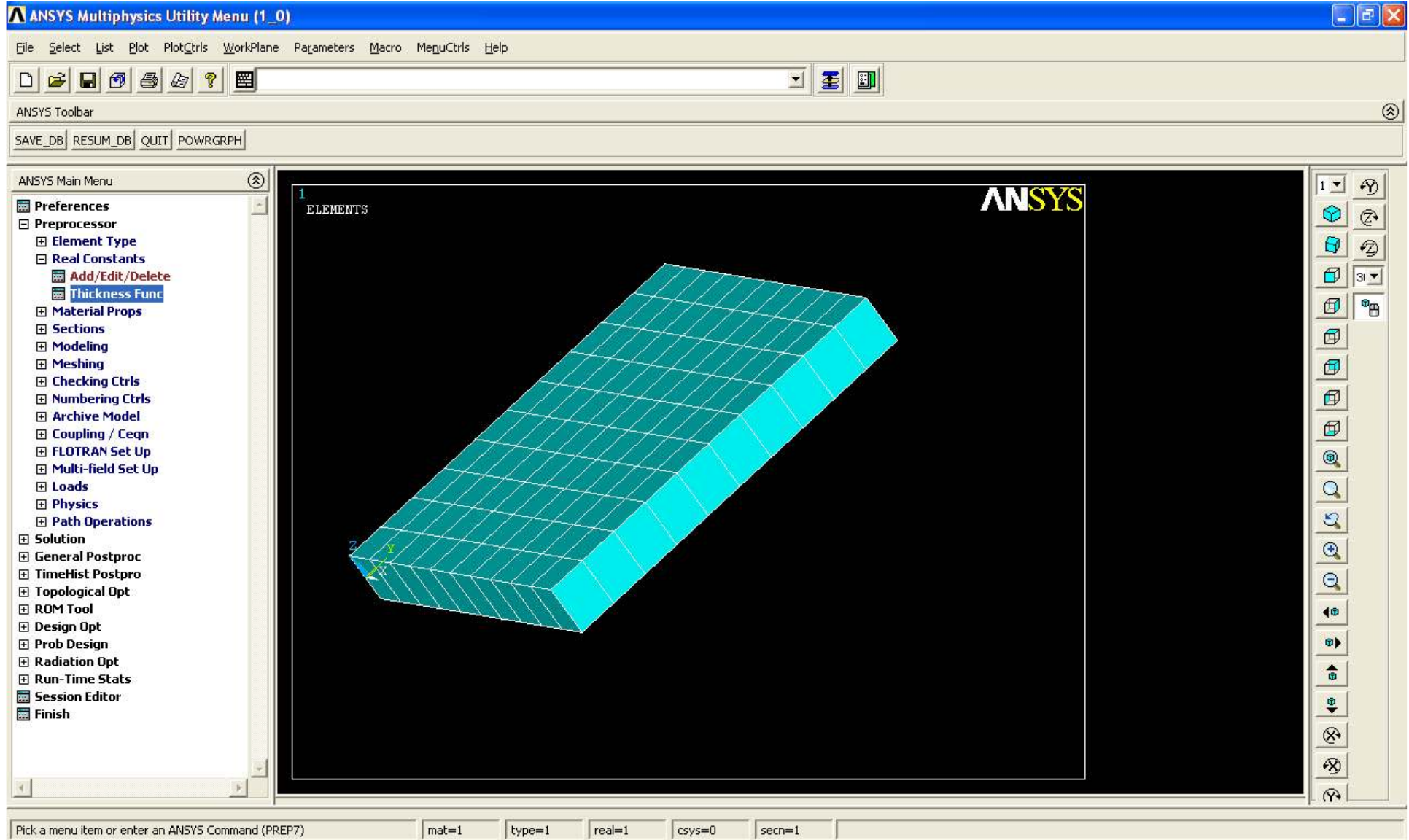
Discipline options

- h-Method
- p-Method Struct.
- p-Method Electr.

Buttons: OK, Cancel, Help

The bottom status bar shows the command prompt: "Pick a menu item or enter an ANSYS Command (BEGIN)" followed by parameters: mat=1, type=1, real=1, csys=0, secn=1.

SABİT KALINLIKLIL İZOTROP PLAK



KALINLIK DEĞİŞİMİ

The screenshot displays the ANSYS Multiphysics Utility Menu (1_0) interface. The main window shows a 3D model of a rectangular plate with a mesh. The thickness of the plate varies linearly from one end to the other, as indicated by the cyan arrow pointing to the macro code. The macro code defines the thickness of each element based on its position along the length of the plate.

```
*GET,MXNODE,NODE,,NUM,MAXD
*DIM,THICK,,MXNODE
*DO,NODE,1,MXNODE
  *IF,NSEL(NODE),EQ,1,THEN
    THICK(node) = (1/25) + (1/50)*NY(NODE)
  *ENDIF
*ENDDO
NODE = $ MXNODE =
```

The ANSYS Main Menu on the left includes the following options:

- Preferences
- Preprocessor
 - Element Type
 - Real Constants
 - Add/Edit/Delete
 - Thickness Func
 - Material Props
 - Sections
 - Modeling
 - Meshing
 - Checking Ctrl
 - Numbering Ctrl
 - Archive Model
 - Coupling / Ceqn
 - FLOTRAN Set Up
 - Multi-field Set Up
 - Loads
 - Physics
 - Path Operations
- Solution
- General Postproc
- TimeHist Postpro
- Topological Opt
- ROM Tool
- Design Opt
- Prob Design
- Radiation Opt
- Run-Time Stats
- Session Editor
- Finish

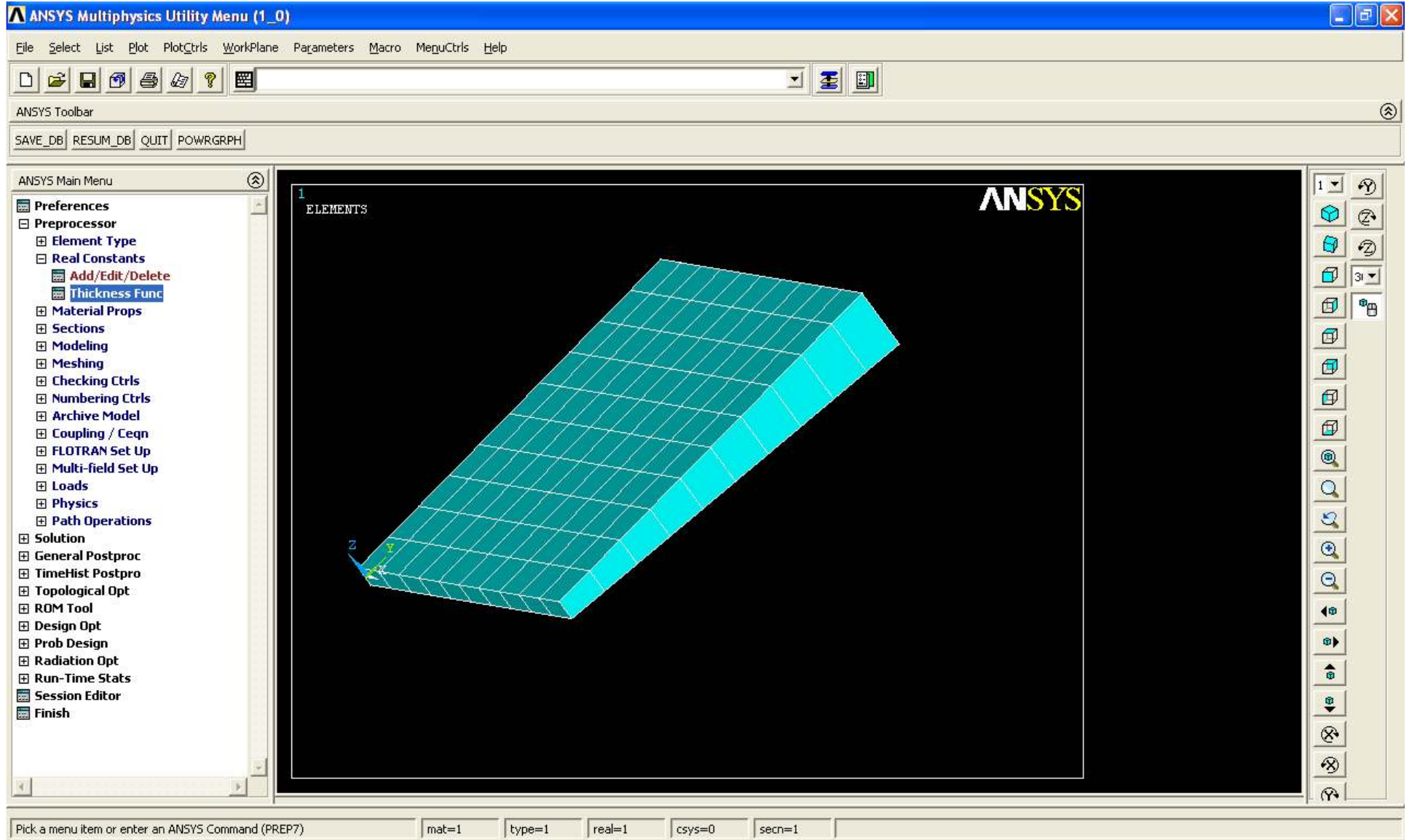
KALINLIK DEĞİŞİMİ

The image shows the ANSYS Multiphysics Utility Menu (1_0) interface. The main window displays a 3D model of a rectangular block with a mesh of elements. A dialog box titled "Function of Shell Thickness vs Node Number" is open, allowing the user to define a function for shell thickness based on node positions. The dialog box contains the following fields and options:

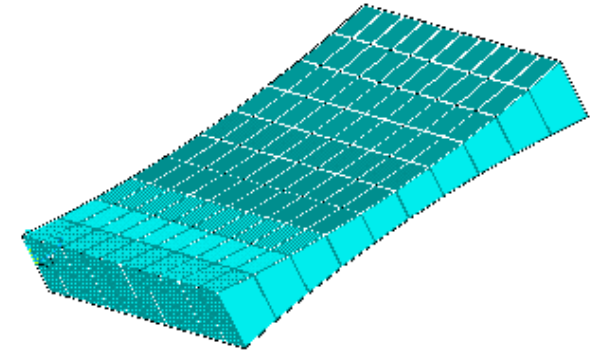
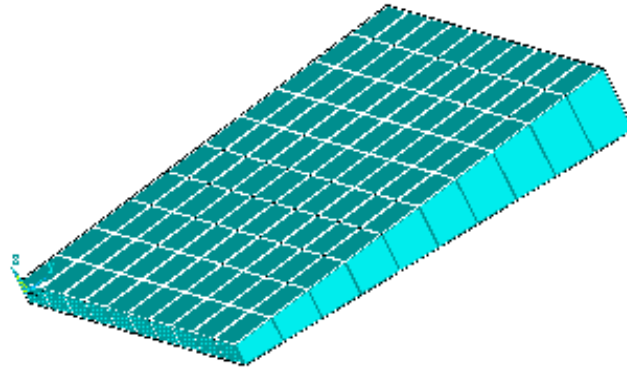
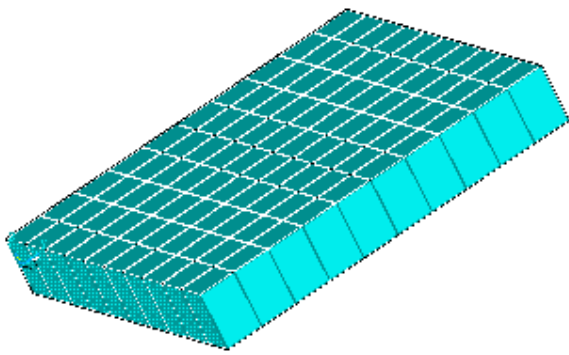
- Par: Name of array parameter: THICK
- IPOS: Real positn of node I thck: 1
- JPOS: Real positn of node J thck: 2
- KPOS: Real positn of node K thck: 3
- LPOS: Real positn of node L thck: 4

The dialog box also includes "OK", "Cancel", and "Help" buttons. The ANSYS Main Menu is visible on the left side of the interface, and the status bar at the bottom shows the command "mat=1 type=1 real=1 csys=0 secn=1".

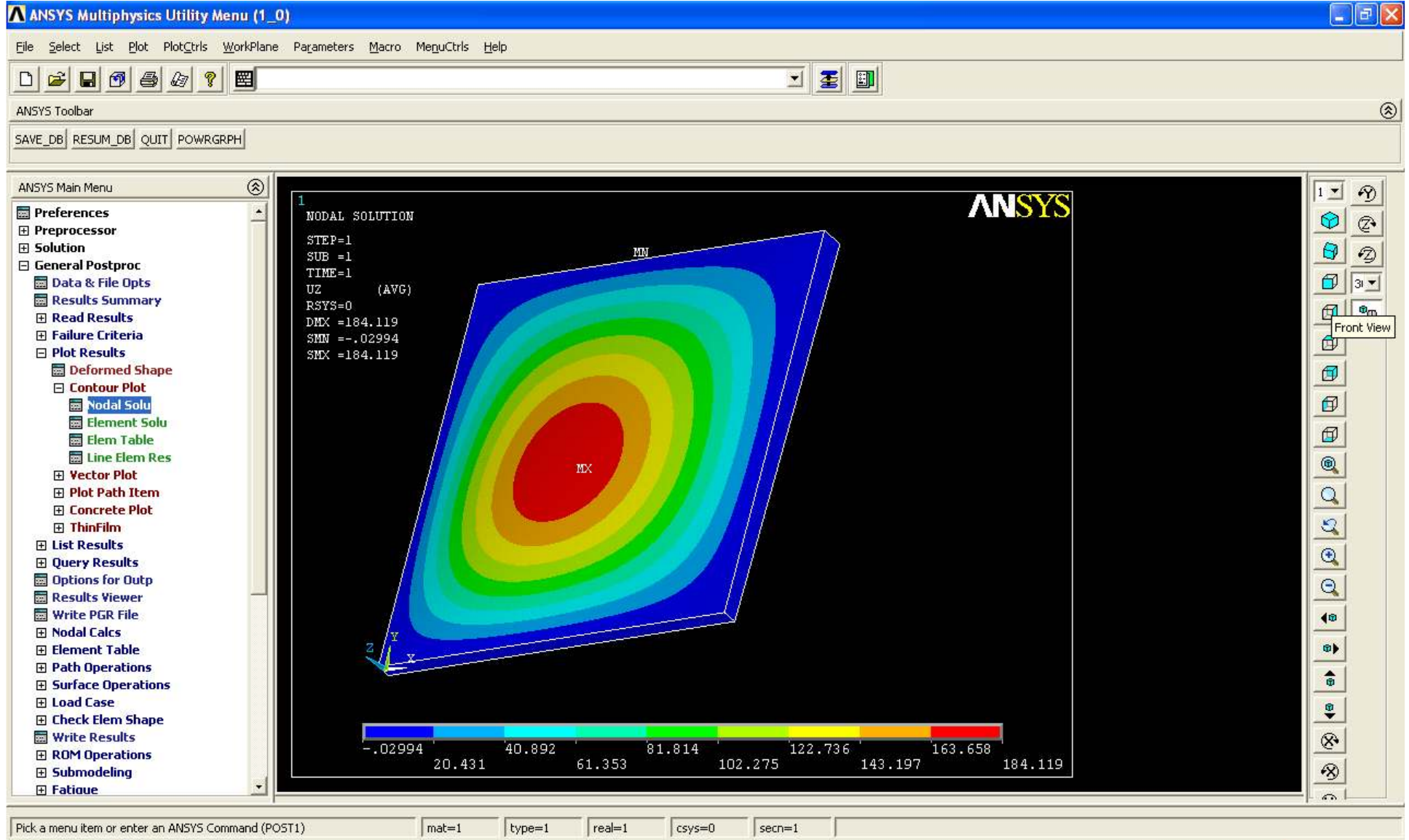
DEĞİŞKEN KALINLIKLI PLAK



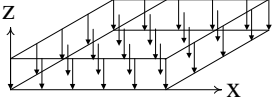
DEĞİŞKEN KALINLIKLI PLAK



SONUÇ

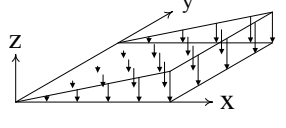


SONUÇ

b/a	Kalınlık Değişimi / Yükleme durumu									
	Sabit ($n = 0$)			Doğrusal ($n = 1$)			İkinci dereceden ($n = 2$)			
	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	
1.0	0.4062	0.4789	0.4789	0.4100	0.4772	0.4628	0.3494	0.4217	0.4510	Zenkour
	0.4057	0.4781	0.4781	0.4096	0.4768	0.4623	0.3490	0.4214	0.4506	Bu çalışma
	-0.1231	-0.1754	-0.1754	-0.0976	-0.0901	-0.1188	-0.1145	-0.0783	-0.0887	% Fark
1.5	0.7724	0.8116	0.4984	0.7795	0.8115	0.4774	0.6766	0.7231	0.4858	Zenkour
	0.7722	0.8115	0.4984	0.7795	0.8114	0.4771	0.6765	0.7231	0.4857	Bu çalışma
	-0.0259	-0.0154	-0.0100	0.0000	-0.0092	-0.0628	-0.0148	-0.0069	-0.0206	% Fark
2.0	1.0129	1.0168	0.4635	1.0229	1.0194	0.4427	0.9097	0.9259	0.4667	Zenkour
	1.0121	1.0164	0.4633	1.0222	1.0190	0.4422	0.9090	0.9255	0.4664	Bu çalışma
	-0.0790	-0.0393	-0.0539	-0.0684	-0.0392	-0.1129	-0.0769	-0.0432	-0.0686	% Fark

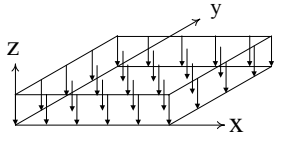
Tablo 1. Dört kenarından basit mesnetli, düzgün yayılı yükle yüklü dikdörtgen plakların orta noktasındaki boyutsuz çökme ve boyutsuz eğilme momentleri.

SONUÇ

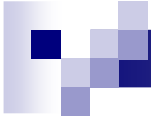
b/a	Kalınlık Değişimi / Yükleme durumu									
	Sabit ($n=0$)			Doğrusal ($n=1$)			İkinci dereceden ($n=2$)			
	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	
1.0	0.2031	0.2394	0.2394	0.2050	0.2386	0.2314	0.1747	0.2108	0.2255	Zenkour
	0.2029	0.2392	0.2392	0.2048	0.2384	0.2311	0.1745	0.2107	0.2253	Bu çalışma
	-0.0985	-0.0710	-0.0710	-0.0976	-0.0880	-0.1167	-0.1145	-0.0569	-0.0887	% Fark
1.5	0.3862	0.4058	0.2492	0.3898	0.4058	0.2387	0.3383	0.3616	0.2429	Zenkour
	0.3861	0.4058	0.2492	0.3897	0.4057	0.2385	0.3383	0.3615	0.2429	Bu çalışma
	-0.0259	-0.0123	-0.0110	-0.0257	-0.0185	-0.0649	0.0000	-0.0207	-0.0185	% Fark
2.0	0.5064	0.5084	0.2318	0.5114	0.5097	0.2214	0.4548	0.4630	0.2334	Zenkour
	0.5060	0.5082	0.2316	0.5111	0.5095	0.2211	0.4545	0.4628	0.2332	Bu çalışma
	-0.0790	-0.0433	-0.0733	-0.0587	-0.0353	-0.1355	-0.0660	-0.0540	-0.0900	% Fark

Tablo 2. Dört kenarından basit mesnetli, üçgen yayılı yükleme yüklü dikdörtgen plakların orta noktasındaki boyutsuz çökme ve boyutsuz eğilme momentleri.

SONUÇ

b/a	Kalınlık Değişimi / Yükleme durumu									
	Sabit ($n = 0$)			Doğrusal ($n = 1$)			İkinci dereceden ($n = 2$)			
	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	\bar{w}	\bar{M}_x	\bar{M}_y	
1.0	0.1917	0.2439	0.3324	0.1944	0.2428	0.3215	0.1548	0.2029	0.2995	Zenkour
	0.1915	0.2437	0.3322	0.1943	0.2426	0.3210	0.1547	0.2029	0.2993	Bu çalışma
	-0.1043	-0.0656	-0.0632	-0.0514	-0.0741	-0.1524	-0.0646	0.0049	-0.0801	% Fark
1.5	0.5326	0.5848	0.4595	0.5393	0.5857	0.4432	0.4538	0.5085	0.4368	Zenkour
	0.5325	0.5848	0.4594	0.5393	0.5857	0.4428	0.4538	0.5086	0.4367	Bu çalışma
	-0.0188	-0.0085	-0.0272	0.0000	0.0000	-0.0846	0.0000	0.0098	-0.0229	% Fark
2.0	0.8445	0.8687	0.4736	0.8539	0.8717	0.4560	0.7506	0.7838	0.4692	Zenkour
	0.8439	0.8683	0.4733	0.8534	0.8714	0.4555	0.7501	0.7835	0.4689	Bu çalışma
	-0.0710	-0.0426	-0.0549	-0.0586	-0.0321	-0.1140	-0.0666	-0.0344	-0.0703	% Fark

Tablo 3. Karşılıklı iki kenarı ankastre, diğer kenarları basit mesnetli düzgün yayılı yükü yüklü dikdörtgen plakların orta noktasındaki boyutsuz çökme ve boyutsuz eğilme momentleri.



TEŞEKKÜRLER...