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### **Title**

Deflection of a Thick Ring with Multipole-Magnet-Like Loads

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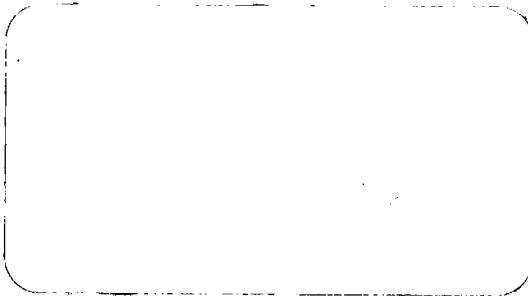
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<b>ENGINEERING NOTE</b>		MD1111	M5439A	1 of 1
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R. Meuser	Mech	Berk	Dec 5 1979	
PROGRAM - PROJECT - JOB				
High-Field Magnet Development				
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TITLE				
Deflections of a Thick Ring with Multipole-Magnet-Like Loads.				

A revision, 11-3-80. Exponents changed

In a previous note (Ref 1), formulas for stresses were presented for surface normal and shear forces varying as  $\cos n\theta$  and  $\sin n\theta$ . With the stresses known, the deflections can be calculated from the formulas given in (Ref 2), namely:

$$u = \frac{r}{E} \left\{ \begin{aligned} & [(-n+2)A, r^n - nB, r^{n-2} + (n+2)C, r^{-n} + nD, r^{-n-2}] \\ & + D [(-n-2)A, r^n - nB, r^{n-2} + (n-2)C, r^{-n} + nD, r^{-n-2}] \end{aligned} \right\} \cos n\theta$$

$$v = \frac{r}{E} \left\{ \begin{aligned} & [(n+4)A, r^n + nB, r^{n-2} + (n-4)C, r^{-n} + nD, r^{-n-2}] \\ & + D [nA, r^n + nB, r^{n-2} + nC, r^{-n} + nD, r^{-n-2}] \end{aligned} \right\} \sin n\theta$$

(Note: These have been translated from the nomenclature used in Ref. 2 into that of Ref. 1 and rearranged. Apparently there is an error in formulas as presented in Ref 2; the stresses, Hook's Law equations, and deflections are not compatible. The above equations are correct.)

The constants  $A_1, \dots, D_1$  are evaluated from the loads using the formulas in Ref. 1

Ref 1 Eng. Note. M5255, Meuser, Oct 23 1978

Ref 2 Handbook of Engineering Mechanics, W. Flügge, 1st. Ed. (1962) pp. 37-17, 18.

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