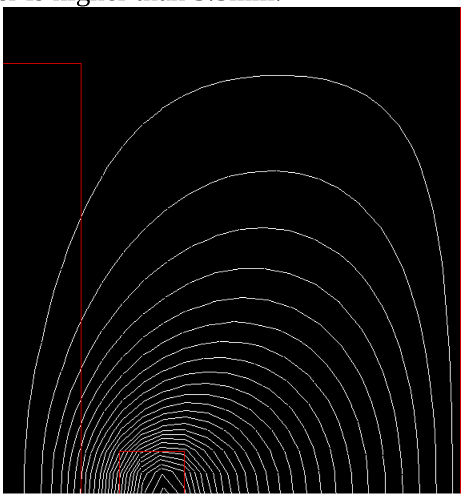
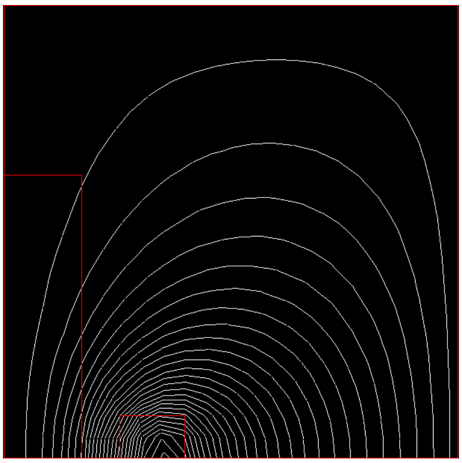
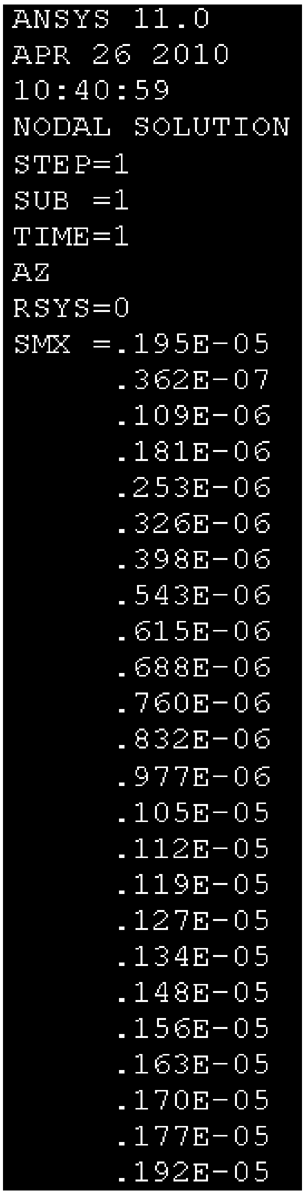
In this paper, static analysis was adopted. Fig.19 is the 2D magnetic flux lines distribution and Fig.20 is magnetic flux density vector sum. In Fig.19 (a) and Fig.20 (a)the height of the height of copper cylinder simulation model is 7.5mm, In Fig.19 (b),the height of the height of copper cylinder simulation model is 5mm. In Fig.20 (b),the height of the height of copper cylinder simulation model is 3.5mm.Fig.19 (c) is the value of the magnetic flux lines. Fig.20 (c) illustrate the magnetic flux density vector sum represented by different colors. From Fig.19, wo can see that the magnetic flux lines can not reach 5mm of the height of copper cylinder in 1A excitation current and there are not magnetic flux through the center of the copper cylinder.In the above measurement, the excitation current that agilent instrument 4294A exported is not less than 1A, so the magnetic flux lines can also reach 5mm of the height of copper cylinder. From Fig.20, wo can see that the magnetic flux density vector sum have already no change when the height of copper cylinder is higher than 3.5mm.



a

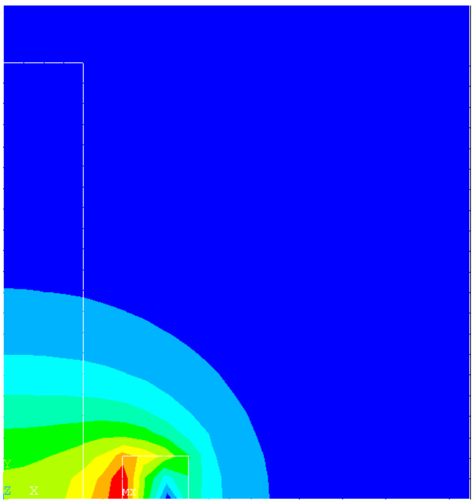


b

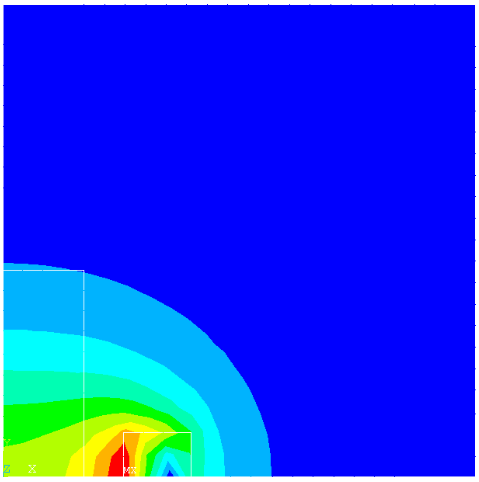


c

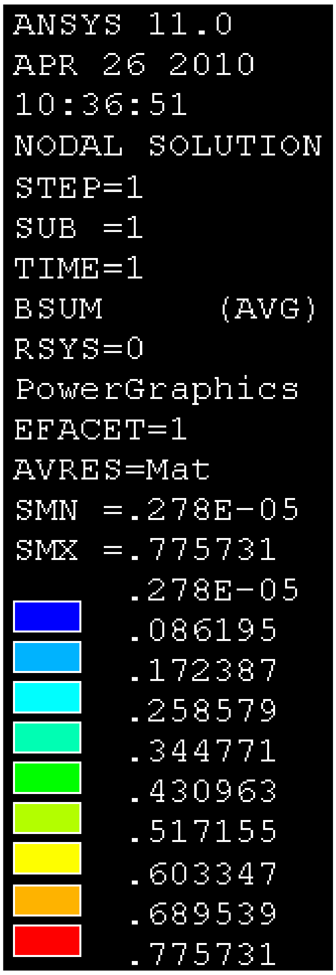
Fig.19. 2D magnetic flux lines



a



b



c

Fig.20.magnetic flux density vector sum

Now,wo can know why the measurement is abnormal when the height of the copper cylinder is higher than 4.5mm, there are not magnetic flux lines that can reach 5mm of the height and the magnetic flux density vector sum have already become very weak when the height of copper cylinder is higher than 3.5mm.

5 Conclusion

In this article, this measurement result was found that the fluctuation amplitude of the coil inherent inductance L gradually reduces with increasing of frequancecy while the fluctuation amplitude of the coil inherent resistance R gradually increases with the increasing of frequancecy.Then ,according to the basic principle of eddy current testing, some experiments in this paper prove that the equivalent resistance R and the equivalent impedance Z of the eddy current testing equivalent circuit is unstable in repeated measurements, but the equivalent inductance L has a good stability and can be used to measure the height of copper cylinder at an appropriate frequancecy after doing a calibration between the equivalent inductance L and the height of copper cylinder. Besides, the abnormal measurement result of the equivalent inductance L was illustrated by the finite element electromagnetic field simulation when the copper cylinder is too high.

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