An MIT 1 GHz (23.5T) NMR magnet design is analyzed in this study. The magnet parameters are shown in Fig. 2. The half magnet has 20 coils that are count from bottom to top coil.

### A. Inductance

![Fig. 2. A quarter cross-section model of the MIT 1 GHz (23.5T) NMR magnet](image)

The total inductance of the 23.5T magnet is 10.1954H, compared to the 10.1928H of the FEM method.

### B. Axial Force

![Fig. 4. The air force calculation result](image)

The proposed method with 5 Gaussian points calculation time is 20.97s, and the FEM method is 236.2s.

### Conclusion

- The results obtained by suggested method are in excellent agreement with other methods.
- This procedure are more general to calculate most coils.
- This approach has an obvious advantage for computational time advantage in multi-coils NMR system.
- The method can calculate inductance and force separately.