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PDF文档

蒙特卡罗方法和三维数字人体模型在放疗计划质量保证中的应用

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放射治疗的质量保证是保证放射治疗手术成功的有力方法。对于放疗计划的验证和评估有CT模拟机、仿体等方法，这些方法各有优缺点。提出了一种用人体图像数据构造仿真模型的方法，并用蒙特卡罗软件和美国“可视人项目”的数据集计算该模型在接受放射治疗时体内剂量的三维分布。由于采用人体的真实图像数据，以及蒙特卡罗方法计算粒子输运时的准确性，该方法能够得到真实的三维剂量分布。

Monte Carlo Method and 3D Digital Human Model Applied for Quality Assurance of the Radiotherapy Treatment Planning

Quality assurance in the radiotherapy treatment planning is an effective method to assume the success of radiotherapy. To validate and evaluate the radiotherapy treatment planning, such methods as CT simulator and phantom have their own advantages and disadvantages. A method based upon human image data is proposed to design the simulation model. The Monte Carlo software MCNP and the Visible Human Project (VHP) dataset are used to simulate the 3-D dose distribution in human body during the procedure of radiotherapy treatment. Because of the use of human real image data and the accuracy of Monte Carlo method in computing the particle transportation, this method can obtain the real 3-D dose distribution in radiotherapy treatment.

关键词

虚拟人(Visible Human Project); 蒙特卡罗(Monte Carlo); MCNP; 放射治疗(Radiotherapy); 放疗计划(Radiotherapy Treatment Planning); 质量保证(Quality Assurance)