

## Rancang bangun sistem verifikasi dosis pada radioterapi tumor paru-paru = Design and construction of a dose verification system for lung tumor radiotherapy.

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### Abstrak

Pergerakan pernafasan manusia, sesuai dengan mengembang dan mengempisnya paru-paru mengakibatkan bergerany tumor ke arah sumbu x, y, dan z dengan asumsi mereka adalah arah sumbu Inferior-Superior, kiri-kanan, dan Anterior-Posterior. Selain bergerak secara linear, tumor juga berputar dengan sudut putar. Tujuan dari penelitian ini adalah mengimprovisasi sistem gerak pada fantom toraks dinamik in-house dengan mengambahankan satu buah arah gerak menggunakan tiga buah stepper motor. Sehingga dilakukan rancang bangun sistem penggerak fantom toraks dinamik in-house dengan 3 degree of freedom. Hasil verifikasi sistem penggerak memperlihatkan bahwa ketiga jenis stepper motor, yang digunakan cocok, layak, dan cukup presisi untuk digunakan sebagai alat penggerak. Jika dibandingkan dengan literatur, alat penggerak yang digunakan cukup berbeda karena berbeda ukuran ulir dan besarnya gear of ratio.

.....The movement of respiration on human according to their lungs expansion and deflation results in the movement of tumor in x, y, and z axis, with assumption that they move in Superior-Inferior, Left-Right, and Anterior-Posterior axis, respectively. Other than linear movement, tumor could also move rotationally. The purpose of this study is in improvisation the system movement on Dynamic Thorax Phantom In-house by adding new type of movement with the help of three stepper motor. Therefore, this study is going to design and create system movement for Phantom Thorax Dynamic In-house with 3 degree of freedom. The results of the verification of the systems shows that all three stepper motors are suitable and precise enough to be used in this new systems. If the results are compared by literature that are used, there might be difference in how much steps are required to create a certain amount of movement, this happen because of the different type of stepper motor that are used with different kind of lead gear and gear of ratio.