

MDPH480/PHYS480/ASTR480/MAPH480 Research Projects 2009

Project Title: Lung tumour modelling for radiotherapy

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Abstract of the Proposed Research

For treatment of lung tumours with radiotherapy relatively large treatment margins are required to account for breathing induced tumour motion. If the tumour position was known at all times correction strategies can be applied to reduce the volume of healthy tissue being irradiated.

The aim of this project is to model mathematically and by means of simulations the relationship between abdominal and lung tumour motion, based on real clinical data, and involves:

- Investigation of the physiology of breathing
- Design of an improved mathematical model (see Fig. 1 for current model) based on previous findings
- Derivation of governing equations
- Consideration of simplifications
- Modelling in Matlab
- Application of model to real clinical data sets

This project is ideal for a student with a solid background in mathematics. Basic Matlab skills are an advantage but not required..

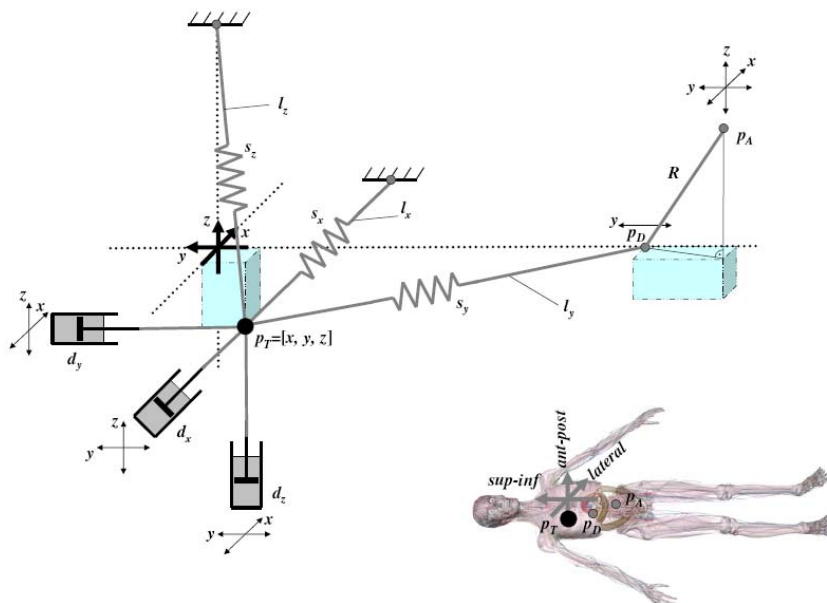


Figure 1: Spring-dashpot model