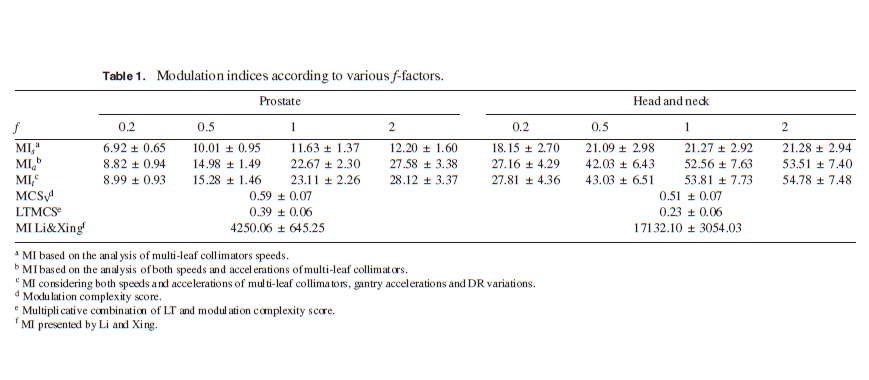
**VMAT TRF(Treatment Delivery System) file analysis with RTplan DICOM(TPS)**

* Target Dose: 61.6Gy/28fx
* Total MU: 643.5
* Number of control points: 147
* Max. Gantry Speed (TPS): 6 deg/s
* Max. Dose Rate (720MU/min)
* Max. num of Arc: 1

Inspired by Park, J. M., they consider leaf speed, leaf acceleration, gantry speed and dose rate in QA metrics, found the MI\_s, MI\_a, MI\_t had high correlation with gamma passing criteria results in VMAT plan. But the conventional QA metrics like MCS/LTMCS seems in-correlated with VMAT QA results.

**(Mateirals):**

* 20 NPC and 20 Prostate VMAT plans
* Eclipse System (two full arcs), dose grid 2.5mm
* MapCHECK2 (measured 2D dose distribution V.S. TPS calculated dose)



手机屏幕截图

描述已自动生成

**We aim to use RTPlan DICOM to estimate the gantry speed, MLC speed, acceleration and dose rate during the delivery. But the difference between PLAN DICOM and TRF indicates the estimate for MLC speed, gantry speed is far away from the reality.**

1. **Check the consistency of differential MU between TPS and TDS**

截图里有图片

描述已自动生成

1. **Check time interval between control points (estimated from DICOM VS. Delivery).**

**手机屏幕截图

描述已自动生成**

1. **Check average gantry speed between control points (estimated from time interval). Though gantry speed exists negative, the dose rate is 0 in this gantry position. So it won’t influence the final delivery dose.**

**图片包含 游戏机, 文字

描述已自动生成**

****

**图片包含 游戏机

描述已自动生成**

1. **Check average dose rate between control points (estimated from time interval)**

****

1. **Check MLC speed between 2 control points (from TRF e.g. CP3-> CP4)**

**图片包含 游戏机, 截图

描述已自动生成**

**图片包含 游戏机, 截图

描述已自动生成**

**截图里有图片

描述已自动生成**

**Reference**

**[1]** Park, J. M., Park, S. Y., Kim, H., Kim, J. H., Carlson, J., & Ye, S. J. (2014). Modulation indices for volumetric modulated arc therapy. *Physics in Medicine & Biology*, *59*(23), 7315.

**Next Plan**

1. **To ensure the current MATLAB code compatible to 2,3,4 Arcs in Monaco TPS (MoreThan2Arcs)**
2. **Variation of Time interval, Leaf Speed, Acceleration, Gantry Speed, Acceleration between TPS and TDS should be further researched (TRF\_LOG\_Analysis) -> dig the MOSAIQ sequencer algorithm and integrity.**
3. **Unity fraction plan QA metrics statistics e.g. ATP for three sites CAMSUnity, SYSUCCUnity, SDUnity. (Elekta-Unity/QA metrics)** 
   1. **E.g. Plan complexity increase, delivery time increase, Total MU increase; QA quality decrease**
   2. **E.g. QA metrics like plan irregularity, plan modulation, aperture area \* MU ……**
   3. **E.g. Develop an independent tool for online adaptive plan QA results evaluation and prediction.**

**Salesforce Issues (*Unity monaco 5.40 increasing complexity of adapted plans)***

1. **Unity Virtual Leaf concept**