

## **An Algorithm for Calculating Isodose Distributions and Wedge Factors for Enhanced Dynamic Wedge Symmetric and Asymmetric Fields**

The FOCUS implementation of Varian's Enhanced Dynamic Wedge (EDW) is presented. Calculations of both dose distributions and wedge factors (WFs) are based on Segmented Treatment Tables (STTs), which are energy-dependent tables that describe dose delivery and jaw position "segments" required to deliver wedged dose. Calculating dose requires a "transmission matrix" derived from an STT to model the modified fluence from the source. The dose calculation is then performed using either the Clarkson or Convolution/Superposition algorithms. An initial "primary dose/MU fraction" WF estimate at the center of symmetric and asymmetric fields is calculated from the STT as the ratio of relative dose delivered on the axis of the weight point divided by total relative dose delivered for the treatment. The novelty in our approach is that we go beyond this initial estimate with a "scatter dose" correction. This correction requires measured 60 degree WFs for five fields. Scatter corrections derived from measured WFs are interpolated for other wedge angles and field sizes in much the same way as arbitrary wedge angle STTs are derived from a "Golden STT" using the "ratio of tangents" formalism. Dose comparisons with measured distributions show good agreement for 6 and 18 MV beams for all EDW angles. Agreement with measurements to within 1% is obtained for WFs in all symmetric and asymmetric fields for 6, 10, and 18 MV beams. For large wedge angles and field sizes, this represents a significant improvement over the 3-4% errors often observed using the MU fraction model alone.