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優勝作品專輯

作品編號　**010045**

參展科別　**數學**

作品名稱　**The Polar Equation from Butterfly Sprinkler Heads**

得獎獎項　**三等獎**

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Abstract

This project aims to create the polar equations from the relation of the points on the centre line of the water twisted from Butterfly sprinkler heads. The water path includes inner rim, outer rim and centre line laying in the middle of the water path is used Rhombus's property. The diagonals are perpendicular bisectors of each other to create the centre line. Then we create the polar equation of the centre line of water that twists from 4 types of the Butterfly sprinkler heads: edge frame, curve frame, STL and STL rotary. The polar equation of outer rim and inner rim is created by adding and removing the " f " value (; is the distance between the outer rim and the centre line, and is the geometric sequence that is) of the coefficient (a) of the polar equation respectively. The results show that the formal equation of the centre line is which can explain the different properties of Butterfly sprinkler heads. If " f " value is increasing the water path and the blade will be wider that affects droplets distributing thoroughtly. Furthermore the relationship between the volume of water and the radius of water distribution can be processed to find the least time that can increase the appropriate moisture level of soil.

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This is an interesting project. Starting from measuring real data for the inner rim, outer rim, and the centre line, The authors create the polar equation to explain the different properties of Butterfly sprinkler heads. The model is then used to find water efficiency for farms. To justify the usefulness of the model, the referees suggest that they should measure the amount of water usage before and after their study in order to claim that their model actually improves the current eater path.