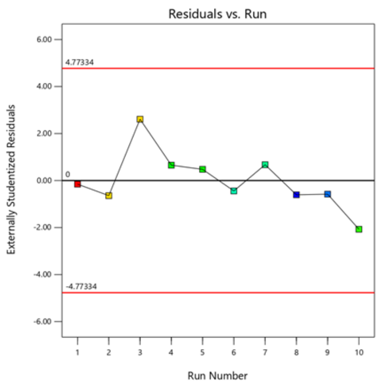

Fig. 4. Residuals against run tests for surface roughness parameter.

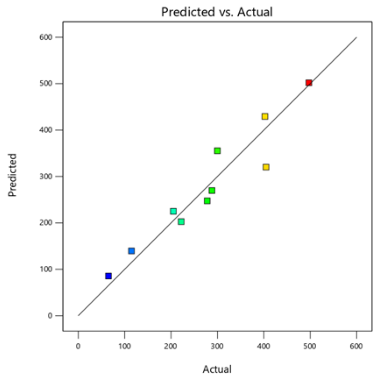

Fig. 5. Predicted response *vs*. the actual values for surface roughness parameter for copper coatings.

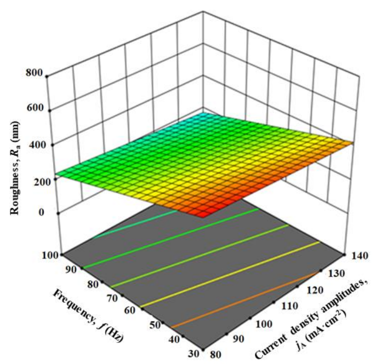

Fig. 6. 3D response surface curves for the surface roughness. A coating thickness of 35 µm was selected for prediction.

IV. Conclusion

The conditions suitable for formation of compact and uniform Cu coatings of a satisfactory roughness by the regime of pulsating current (PC) were defined. The Cu coatings were obtained with variation of an amplitude of current density, frequency and coating thickness. The minimal roughness showed the Cu coatings obtained at 100 Hz with the current density amplitude of 100 mA cm^{-2} and coating thickness at 10 µm. From the results obtained by application of two different models follows:

-The coating thickness has strong influence on micro roughness;

-The current density also strongly affected the coating roughness, but less than frequency.

-Both RSM and ANN show good agreement with experimental results.

-Both methods can be effectively used to predict coating roughness.

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