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**Title of the Presenter: Distinguished Chair** Prof.

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**On the degenerate scale in the MFS/BEM**

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It is well known that the method of fundamental solutions is an acceptable approach for solving engineering problems. It is a paradise in several aspects, meshless as well as infinite domain problems. Several successful experiences in Taiwan have been demonstrated. However, it also results in paradox and parasites in some cases. Rank-deficient matrix appears due to the degenerate scale, degenerate boundary, spurious eigenvalue and fictitious frequency once the MFS/BEM is used for solving boundary value problems. Based on the degenerate kernel for expanding the closed-form fundamental solution, the rank deficiency in the MFS can be easily understood. In this talk, three parts will be given. First, the TwSIAM will be introduced. Second, the related academic activity in Taiwan will be addressed. Third, the rank-deficiency system in the MFS/BEM will be reviewed and the degenerate scale in the MFS will be studied by using complex variables. Logarithmic capacity in the modern potential theory will be understood in a new way of degenerate scale in the MFS. Finally, degenerate scales of various shapes, circle, ellipse, semi disc, polygon as well as two tangent discs will be demonstrated not only analytically but also numerically. Besides, I will mention recent works of NTOU/MSV group on the quaternion and the Clifford BEM.

Keywords: method of fundamental solution, rank deficiency, degenerate scale, BEM/BIEM