

## **A COMPARISON BETWEEN SINGULAR VALUE DECOMPOSITION AND EIGENVECTOR METHOD IN GROUP DECISION MAKING**

(Perbandingan di antara Kaedah Penguraian Nilai Singular dengan Kaedah Vektor Eigen dalam Pembuatan Keputusan Berkumpulan)

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### *ABSTRACT*

In any group decision making exercise, the issues of having justified and consistent decisions are always of major concerns, especially when the group members come from diverse backgrounds, selection expectations and priorities, and there are a number of selection criteria to consider. This paper looks at these issues in the faculty member selection domain where the objective is to select the best candidate to be the new faculty member. Two hypotheses are tested using two-way ANOVA; overall candidates' ranking depends on their own performance and competencies, and overall candidates' ranking does not depend on individual selection committee members' different roles. Selection committee members were treated as treatment factor while the candidates as the blocking factor. Singular value decomposition (SVD) and eigenvector method (EM), two different methods in analytic hierarchy process (AHP) were used to obtain the rankings. The statistical tests showed that both SVD and EM resulted in the same conclusion, that is the overall candidates' ranking does not depend on the difference in the selection committee members' selection criteria preferences, but on the individual candidates' performance and competencies. Hence, all parties can be assured of an unbiased evaluations and the selection process itself is conducted in the most professional manner.

*Keywords:* group decision making; SVD; EM; two-way ANOVA; analytic hierarchy process

### *ABSTRAK*

Apabila berbincang mengenai pembuatan keputusan oleh sesuatu kumpulan, isu yang biasa ditimbulkan adalah mengenai ketepatan dan keseragaman keputusan yang dicapai, terutamanya apabila ahli-ahli kumpulan terdiri daripada individu yang mempunyai kepelbagaian latar belakang akademik, jangkaan dan nilai keutamaan terhadap kriteria pemilihan. Dalam masa yang sama, terdapat beberapa kriteria pemilihan yang turut perlu diteliti oleh mereka. Oleh itu dalam makalah ini dilihat kepada isu-isu tersebut dalam domain pemilihan ahli baru di dalam sesebuah fakulti. Dua hipotesis diuji menggunakan kaedah ANAVA dua hala, iaitu pertama, keputusan kedudukan keseluruhan pemohon bergantung pada prestasi dan kelayakan mereka dan kedua, keputusan kedudukan keseluruhan pemohon tidak bergantung kepada kepelbagaian latar belakang dan nilai keutamaan kriteria pemilihan oleh ahli jawatankuasa pemilihan. Untuk ujian ini, ahli jawatankuasa pemilihan ditetapkan sebagai faktor rawatan manakala para pemohon pula sebagai faktor penghalang. Dua kaedah telah dipilih untuk menghasilkan keputusan kedudukan pemohon, iaitu kaedah penguraian nilai singular dan kaedah vektor eigen dalam proses analisis hierarki. Hasil ujian kedua-dua kaedah menunjukkan bahawa keputusan kedudukan pemohon tidak bergantung pada kepelbagaian latar belakang dan pilihan ahli jawatankuasa pemilihan tetapi sebaliknya kepada prestasi dan kelayakan pemohon. Oleh yang demikian, semua pihak yang terlibat di dalam proses pemilihan, sama ada para pemohon mahupun ahli jawatankuasa pemilihan wajar yakin akan proses penilaian yang adil dan saksama yang mencerminkan sikap profesionalisme ahli jawatankuasa pemilihan.

*Kata kunci:* keputusan pemilihan kumpulan; penguraian nilai singular; kaedah vektor eigen; ANAVA dua hala; proses hierarki analisis

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