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FOREWARD

The response spectrum which has played important roles in aseismic design of structure has been dealt with as that has probabilistic characteristic since it was proposed as a potential tool prescribing the seismic coefficient. It was noted that the spectra were characterized by the magnitude of earthquake, the distance from the epicenter and so on by taking the average of the spectra for many earthquake motions. The followed studies pointed out the randomness of the wave form, the duration of the motion, the existence of the ground predominant periods and so on also could be raised as the parameters for describing the probabilistic characteristic of the spectrum.

While the response spectrum for a lot of earthquake motions has been accumulated and the effort to provide design spectrum as an evaluation due to the analysis has been made, the investigations to estimate the spectrum due to simulated earthquakes based on the random vibration theory have been developed. This approach makes it possible to identify the effect of the respective parameter to the spectrum, and also to estimate and tabulate the seismic coefficient through the simulation process even if the time historical computation is not performed.

It should be kept in mind that the response spectrum due to the time historical computation for an earthquake motion is only a sample from a population and the fluctuation in the shape and the magnitude of the spectrum is naturally supposed to exist. The spectrum which is statistically estimated due to the simulated earthquake has advantage as for this aspect.

However it is still required to make further accumulation of data to many earthquake motions for better understanding of the characteristic of the spectrum, it is expected that the importance of the use of the spectrum due to the simulated earthquake would be increased in the practical aseismic design by taking its advantages into consideration.

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