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Incident wave run-up has minor resonant component

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nvestigation of run-up of incident waves on sloping beaches is a hot topic that presents challenges in both numerical and analytical studies. When the slope includes discontinuities, the spectrum of the problem becomes discrete. This can be dealt with residue summations but the only residue summations in the literatures are based on the summations over the poles of the Fourier-transform
of the forcing rather than the natural frequencies of the system. There are three fundamental shortcomings of this approach. The first is that the design of the solution algorithm is forcing-specific. The second problem is that it is applicable only if the Fourier-transform of the forcing decays exponentially along the imaginary axis. Finally, the series of residues converges only if time is less than certain critical values. Using, instead, the natural frequencies not only gives us the possibility to deal with a practically unlimited spectrum of forcings, but also enables us to test the "resonance" hypothesis for the run-up problem in general. As we noted from very recent literature, the run-up phenomenon in general has been put forward as a resonance phenomenon. In this study we show that the resonance plays a very minor role if the bathymetry is simple and composed of a constant slope and a finite-deph ocean.