

3.2 Interference Analysis

- With many telecommunications services using radio transmissions, interference between services can arise in a number of ways.

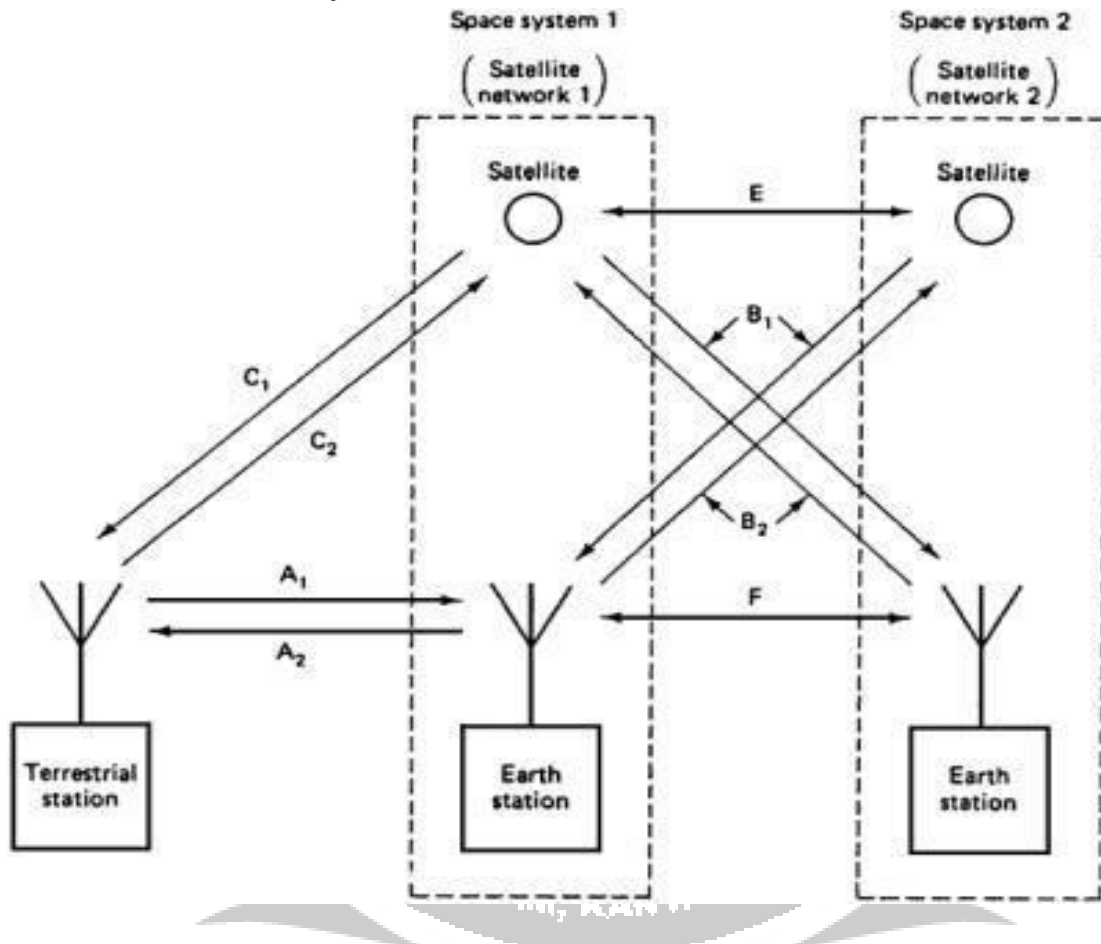


Fig (a)

Possible interference modes between satellite circuits and a terrestrial station

Fig. (a) are classified by the International Telecommunications Union (ITU, 1985) as follows: A1: terrestrial station transmissions, possibly causing interference to reception by an earth station A2: earth station transmissions, possibly causing interference to reception by a terrestrial station B1: space station transmission of one space system, possibly causing interference to reception by an earth station of another space system B2: earth station transmissions of one space system, possibly causing interference to reception by a space station of another space system C1: space station transmission, possibly causing interference to reception by a terrestrial station C2: terrestrial station transmission, possibly causing interference to reception by a space station E: space station transmission of one space system, possibly causing interference to reception by a space station of another space system F: earth station transmission of one space system, possibly causing interference to reception by an earth station of another space system

Interference between satellite circuits

- A satellite circuit may suffer from B1 and B2 mode of interference with the number of neighbouring satellite circuits. This resultant effect termed as **aggregate interference**.
- But the study of aggregate interference is limited, instead **single entry interference** studies considered into account.
- **single entry interference** refers to the interference produced by single interfering circuit on a neighbouring circuit.
- The system performance is determined by the ratio of wanted carrier to the interfering carrier power.
- The radiation pattern of the antenna controls the interference. To relate C/I ratio to the antenna radiation pattern, consider some parameters. They are geocentric point, topocentric point, orbital spacing and orbital spacing angle.

Combined [C/I] due to interference on both uplink and downlink

Interference may be considered as a form of noise, and assuming that the interference sources are statistically independent, the interference powers may be added directly to give the total interference at receiver B. The uplink and the downlink ratios are combined in exactly the same manner described for noise, resulting in Here, power ratios must be used, not decibels, and the subscript “ant” denotes the combined ratio at the output of station B receiving antenna

The presence of unwanted signals on the radio frequency (RF) link produces the potential for interference degradations on the performance of the satellite network Equipment faults such as malfunctioning of Uplink Power Control systems could cause the carrier to increase its power level dramatically impacting other carriers. Uplink systems trying to uplink to a close by satellite may cause interference if the antenna is not aligned correctly to the intended satellite.

